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AIR QUALITY CONSIDERATIONS IN TRANSPORTATION PLANNING:

FINDINGS AND RECOMMENDATIONS ON TRANSPORTATION CONTROL PLANNING

PHASE II

Final Report
to the
United States Environmental Protection Agency

by

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Cambridge, Massachusetts

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16. ABSTRACT

Transportation control plans (TCPs) developed in response to the Clean Air Amendments of 1970 include many of the measures being proposed for increasing the efficiency of existing transportation systems and for energy conservation. The report focuses on ways in which TCP development can be merged with ongoing transportation activities and on the extent to which such integration is desirable. Recommended procedures for assessing the consistency between transportation proposals--the long range element, the transportation systems management element (TSME), the unified work program, the transportation improvement program, and specific projects--and air quality needs are presented. The report includes identification of opportunities for improving coordination among DOT and EPA programs, focusing on the TSME and TIP regulations and on the opportunities for interaction provided by the Intermodal Planning Groups and recommendations on how the transportation control planning process can be strengthened, including coordination with programs which may improve air quality, use of existing organizational arrangements and expertise, and the need for a sound process for control planning and implementation. In addition, issues involved in parking management are explored, and recommendations are made on the development of amendments to the Clean Air Act.

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SUMMARY

DEFINING CONSISTENCY

- Further clarification of the consistency procedure is desirable both to avoid misunderstandings between E.P.A. regional offices and transportation agencies, and to provide a key lever for encouraging transportation planning to support E.P.A.'s goals.

- An analysis of the air quality effects of a long range plan is necessarily approximate, but should be used for a consistency determination where it has already been performed, bearing in mind its approximate nature. Sketch planning techniques are recommended for areas with more general long range plans.

- Underlying assumptions of long range plans should be carefully scrutinized in terms of their potential impacts on consistency.

- The major emphasis in assessing consistency of the long range plan should be on identifying and encouraging the modification of projects and groups of projects with adverse air quality impacts, and on encouraging the inclusion of projects which could improve air quality.

- E.P.A. should encourage D.O.T. to require an air quality analysis for T.S.M. measures; an adequate process for consideration of air quality should be one basis for a finding of consistency.

- The Transportation Improvement Program and the Planning Work Program should be reviewed for evidence that T.C.P. measures included in the 3-C plans are proceeding toward implementation or through the planning process (for the Work Program) according to the schedule anticipated.

- Where agreements on consistency at a project level cannot be resolved due to uncertainties in analysis, it is recommended that consistency be contingent on agreements to monitor the effects of a questionable project, and if necessary, to implement operating policies which reduce the air quality impacts.

OTHER ASPECTS OF THE E.P.A./D.O.T. INTERFACE

- E.P.A. offices must establish communication with both regional and division F.H.W.A. offices.

- E.P.A. should provide advice and criticism to transportation agencies throughout the planning process, not just at the end.

- Liaison with transportation agencies should be a full time position for one or two people in each regional E.P.A. office.

- Continuing involvement with transportation agencies will improve E.P.A.'s understanding of the informal transportation decision-making process and minimize needless conflict.

- E.P.A. should recognize and build on efforts of highway agencies to develop environmentally sensitive transportation planning processes.

- E.P.A. should recognize that change in transportation planning and programs should be carefully promoted and that any movement in the right direction should be considered progress.

- The Intermodal Planning Group meetings provide a forum for discussing air quality issues but cannot be E.P.A.'s sole contact with transportation agencies.

- E.P.A. needs a full understanding of each area's transportation issues in order to function effectively in I.P.G. meetings.

- E.P.A. should send the same person(s) to attend I.P.G. meetings regularly.

- The Process Guidelines contain several provisions which should be used to strengthen air quality decision-making processes in highway agencies.

- E.P.A. and air quality agencies should review Action Plan sections on air quality issues, monitoring, and air quality agency participation and should suggest revisions where appropriate.

TRANSPORTATION CONTROL PLANS

T.C.P. revisions can be used as an opportunity for increasing the coordination between control planning and the ongoing transportation planning process. Two ways of accomplishing this are suggested:

- maximize the number of shared elements of the plans, particularly through the F.H.W.A./U.M.T.A. transportation system management elements.

- make the T.C.P. process compatible with the established urban transportation planning process.

In addition:

- E.P.A. should urge F.H.W.A. and U.M.T.A. to require analysis of all appropriate T.C.P. measures as a first step in T.S.M.E. development (in areas with T.C.P.s); the T.S.M.E. should then include all acceptable T.C.P. measures.

- In all areas (with or without T.C.P.s) E.P.A. should urge the development of a sound process for air quality consideration and analysis as part of T.S.M.E. decision-making, and should urge F.H.W.A. and U.M.T.A. to require information exchange with and involvement of other agencies and the public as part of T.S.M.E. development.

- E.P.A. should monitor the development of the T.S.M.E. in cities having T.C.P.s; problems arising with T.S.M.E.s may be indicative of problems with any short-range transportation planning process.

- E.P.A. should encourage each agency conducting transportation control planning to develop and document a suitable planning and decision-making process, including: identification of alternatives; analysis of environmental, social and economic impact of alternatives; involvement of the public and of other agencies; and identification of responsibility for planning and implementation.

- E.P.A. should work with other federal agencies (including F.H.W.A. and U.M.T.A.) to assist regional planning agencies in developing short-range transportation planning capabilities, including such transitional support as:
    - review and explanation of relevant laws and regulations
    - training in quantitative techniques for short-range measures
    - research to develop appropriate methodologies for analysis and evaluation of short-range measures
    - dissemination of information on short-range measures from T.C.P. experience

- E.P.A. should reaffirm its interest in transportation control planning

PARKING MANAGEMENT PLANS

- Parking is an element of an area's transportation system and should be managed as part of that system to meet air quality goals.
    - Parking management plans and all other parking measures should be made a part of the T.C.P.
    - Parking management plans should be developed at the local level, with regional controls, if necessary, in order to get cooperation from all cities in a region.
    - E.P.A. should encourage local interest in parking management, regardless of local motives for parking controls.
    - E.P.A. should fund a parking management demonstration program to help generate information on impacts of parking controls.
    - Data requirements for parking management plans should be relaxed and made flexible to encourage cities to get their programs under way.

CLEAN AIR ACT AMENDMENTS

- Extension of Clean Air Act deadlines should be considered on a case by case basis, and E.P.A. should require showing reasonable annual progress in implementing measures to improve air quality as a condition for further extensions.

- It is recommended that the governor be permitted to select the metropolitan transportation planning organization for transportation control planning; another agency could be given responsibility for non-transportation related air quality planning.

- The Air Quality Management Plans should include: discussion of alternatives, evaluation of impacts of alternatives, discussion of resources, indication of responsibility for planning and implementation, specific commitments for implementation, and discussion of future planning activities.

- The sanction of cutting off federal funds to non-cooperating areas should be applied carefully so that funding is retained for projects which would help meet air quality goals.

- Language should be added to the Clean Air Act requiring that A.Q.M.A.s submit for approval documents describing their air quality management planning process, and language in the Act should briefly describe topics to be covered in this document. These topics include: identification of alternatives, identification of impacts of alternatives, involvement of other agencies and general public in the planning process, monitoring effects of A.Q.M.P.s, and coordinating them with other ongoing programs.

FOREWORD

This final report has been prepared by the Massachusetts Institute of Technology pursuant to contract 68-01-2476, "Project to Improve the Integration of Air Quality Considerations into Transportation Planning--Phase II," with the United States Environmental Protection Agency. The report identifies findings of the M.I.T. research effort and presents recommendations for future E.P.A. programs and activities.

The authors extend their thanks to the numerous persons in the Washington, D. C., Boston, San Francisco and Los Angeles metropolitan areas who spent substantial amounts of time discussing the transportation and air quality planning issues with members of the M.I.T. project staff; to the staffs of E.P.A. Regions I, III, V, IX, and X, who provided information on current transportation/air quality activities and assisted in identifying further contacts and information; and to the staffs of the Federal Highway Administration and Urban Mass Transit Administration of the U.S. Department of Transportation, who devoted many hours to discussions with M.I.T. on what could be done to increase E.P.A./D.O.T. coordination. We are particularly grateful to Joel Horowitz of the Office of Policy Analysis, E.P.A., and to John Hidinger and his staff, Office of Transportation and Land Use Planning, E.P.A., for their guidance and support.

Lance Neumann of M.I.T. prepared Appendices I and II as part of his Ph.D. research. In addition, he contributed to the authors' understanding of current state and metropolitan transportation planning and programming practices and provided a number of welcome distractions. Charna J. Garber and Gilbert High prepared the report and provided valuable editorial assistance.

While recognizing these contributions, the opinions and conclusions expressed in this report are those of the authors and are not necessarily those of the U. S. Environmental Protection Agency or of the persons who provided information and assistance in the research. The authors take full responsibility for any inaccuracies and omissions.

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I. INTRODUCTION

A. BACKGROUND

Over thirty American cities require reductions in automotive vehicle miles travelled (VMT) in order to meet the air quality standards developed pursuant to the Clean Air Act of 1970.[1] Development of programs to reduce VMT -- transportation control plans (TCPs) - began in 1973. It soon became apparent that TCPs were meeting stiff opposition in a number of cities, and almost everywhere their implementation was slow. It now is likely that most major cities will not meet the standards for transportation - related pollutants by the 1977 deadline.

In fall 1974 and spring 1975, the M.I.T. Center for Transportation Studies conducted a program of research for the U.S. Environmental Protection Agency designed to identify problems arising in the planning and implementation of TCPs and to develop recommendations on future E.P.A. actions. Interviews conducted in three TCP areas, Boston, San Francisco, and Phoenix-Tucson, and in Washington provided the basic information for the study. The final report[2] noted that although confusion over legislative requirements, tight deadlines, and lack of experience with TCP options all contributed to TCP delay and controversy, lack of coordination between transportation control planning and ongoing metropolitan transportation planning was an overriding problem. Not only were there difficulties in coordinating transportation controls with other transportation plans for each area, but there also were lost opportunities for tapping planning capabilities and funds for implementation. Thus, The major recommendation of the study was to increase the level of coordination and, to the extent possible, to integrate transportation control planning with the ongoing transportation planning processes.

B. DESCRIPTION OF THE PHASE II STUDY

The current nine-month study was designed to follow up on some of the recommendations developed in Phase I. The program of work included five tasks:

- assist in developing a workable definition of consistency-

The 1970 Federal-Aid Highway Act requires that highways constructed under the Act be consistent with applicable portions of the state implementation plans (which include the TCPs). However, further clarification of what consistency means in practice is needed both by E.P.A. and by transportation officials. The first task was designed to explore alternative definitions of consistency and to develop recommendations concerning how and on what basis consistency decisions should be made.

- examine the EPA/DOT interface-

The Department of Transportation's Urban Mass Transportation Administration and Federal Highway Administration fund the planning and development of significant portions of the nation's urban transportation systems. Improved coordination between D.O.T. and E.P.A. would provide opportunities to reduce the implementation problems T.C.P.s are now facing and to achieve greater consideration of air quality issues directly in transportation planning. This task was designed to identify opportunities for improving coordination among D.O.T. and E.P.A. programs.

- develop recommendations for future activities in transportation control planning - The need for examination of a wider range of alternatives, improved impact prediction and clarified assignments of responsibility in transportation control planning was identified in Phase I. The purpose of this task was to provide insights on how the transportation control planning process might be strengthened.

- develop guidelines on parking management- Control of parking shows promise for supporting transit use and reducing the competitive advantage of the automobile. However, lack of experience with parking management and the complexity of the institutional controls over parking have impeded the development of coherent management strategies. In this task, some of the issues of parking management planning were explored.

- assist in developing Clean Air Act Amendments- Amendments to the Clean Air Act were proposed by the Ford Administration, various Senators and members of Congress, and numerous interest groups in 1975. This task involved the review of draft amendments and the development of revised or additional language in response to the problems identified in Phase I.

The report reflects information and suggestions obtained through numerous interviews and working meetings at E.P.A., F.H.W.A., and U.M.T.A. offices in Washington, and through discussions in the Boston, San Francisco, and Los Angeles metropolitan areas with federal regional representatives and with state, metropolitan, and local transportation officials. In addiiton, the research builds upon other work done at the MIT Center for Transportation Studies on transportation planning and analysis.[3]

The following sections summarize work performed under each of the tasks.

FOOTNOTES

1. *Clean Air Act*, as amended, 42 U.S.C. 1857 et seq.

2. Bennett, E.D. *et al.*, "The Transportation Control Planning Process: Fundings and Recommendations for Improved Decision-Making", Phase I Final Report to the Environmental Protection Agency, March 1975.

3. See , e.g., Manheim, M.L., *et al.*, *Transportation Decision-Making: A Guide to Social and Environmental Considerations*, NCHRP Report 156, 1975; Manheim, M.L., *et al.*, "Process Guidelines for Consideration of Environmental Effects", Final Report to the Federal Highway Administration, MIT USL Report No. 72-11, June 1972.

II. DEFINING CONSISTENCY

A. INTRODUCTION

The 1970 Federal-Aid Highway Act requires that highways constructed with federal assistance be "consistent with any approved plan for the implementation of any ambient air quality standard for any air quality control region designated pursuant to the Clean Air Act"[1] (underscoring added). Regulations governing the determination of consistency were promulgated by the Federal Highway Administration (F.H.W.A.) in December, 1974,[2] with a heavy emphasis on the consistency of specific highway projects in the design and location phase, and lesser emphasis on overall transportation plans and programs. Further guidance on plan and program consistency developed jointly by E.P.A. and F.H.W.A. was published in April, 1975.[3]

Even after the distribution of these documents, however, considerable uncertainty over responsibilities and procedures for determining consistency still exists among the field office personnel of both E.P.A. and F.H.W.A. In a few cases, differing interpretations of the procedures for adjudging consistency have precipitated confrontations between the two agencies. In many more cases the field offices have been hesitant to proceed boldly without further guidance from Washington.[4]

Further clarification of the consistency procedure should receive the highest priority from E.P.A., not only to avoid misunderstandings between E.P.A. regional offices and transportation agencies, but simply because consistency is a key lever for encouraging transportation planning consonant with E.P.A.'s goals. Consistency determinations can help ensure that plans and projects with a clear likelihood of having adverse air quality effects are modified or eliminated at the earliest possible stage of development; that good air quality analyses are in fact performed as an integral part of the transportation planning process; and that projects which are likely to improve air quality are developed and implemented. The following sections provide recommendations on how consistency determinations should be made.

We feel it is important to stress at the outset that E.P.A.'s role in consistency determinations is not primarily that of decision-maker. Primary responsibility still rests with the Federal Highway Administration; and F.H.W.A.'s approach to achieving compliance with its rules and regulations is to work with state and local agencies on a week-to-week basis and "bring them along" - F.H.W.A. rarely finds it necessary or appropriate to take an unyielding stand in dealing with the transportation agencies. Consistency is particularly an area where a hard-line approach seems inappropriate, since the existing models and calculation procedures all are subject to legitimate challenge and the results are heavily dependent on the accuracy of underlying assumptions.

In some cases, with little or no prior discussion of its dissatisfaction, E.P.A. has taken a strong last-minute stand opposing a positive consistency determination. In every such case of which we have knowledge, E.P.A. has lost credibility and harmed its relations with the agencies involved, and has had very little success in getting its viewpoint adopted. On the other hand, where E.P.A. has taken the trouble to establish a continuing dialogue with federal, state, and local agencies, frank discussion of E.P.A.'s positions has been possible, and E.P.A. has had some success in influencing the direction of transportation studies.

We recognize that some E.P.A. offices have been following a strategy of demanding more than they expect to get in order to force some movement toward their point of view; but we feel strongly that this approach has been generally counterproductive in dealing with transportation agencies and is particularly unworkable for consistency determinations. Enforcement of plan and program consistency provides a good example of this. F.H.W.A. can enforce the consistency regulations principally by denying or threatening to deny certification of a metropolitan area's transportation planning process, an action which cuts off all federal funds for transportation plans and programs. Not only is F.H.W.A. loath to decertify, particularly without giving the Metropolitan Planning Organization an opportunity to correct the deficiencies, but decertification also runs contrary to E.P.A.'s basic interests, since the federal funding for transportation measures which might have air quality benefits is thereby cut off.

Slow implementation of transportation control plans poses another problem for consistency determinations, especially when the reasons for delay are lack of funds, inability to obtain required legislation, or evidence of negligible air quality benefits and/or severely adverse impacts. E.P.A. has sometimes felt that its legal mandate requires insistence on implementation even in the face of these problems, but without much effect. Fighting these battles over again under the guise of consistency determinations offers little likelihood of success. We strongly recommend that E.P.A. use the consistency requirement to put pressure on transportation agencies to implement TCPs where delays in implementation appear to be due simply to foot-dragging, but where the serious problems cited above exist, such pressure is bound to backfire. (In such areas, the round of TCP revisions proposed for 1976 and possible modifications to the Clean Air Act offer the greatest promise for achieving faster implementation of TCPs). The discussions which follow reflect our conviction that the cooperative, negotiatory approach taken by several E.P.A. regions is the sounder one in all cases and should be adopted universally.

B. THE LONG-RANGE ELEMENT

The long-range plan describes those capital projects and programs that an urban area would like to implement over the next 20-30 years. Thus, it should indicate the relative emphasis on highways and transit; areas where new development or changes in land use are believed to require a reorientation of the transit system; and a general indication of the growth policies of the area and how transportation will be coordinated with those policies. The long-range plan thus provides an opportunity to assess the extent to which the evolving transportation and land use patterns will minimize adverse air quality impacts. It also may permit the anticipation of problem areas, so that modifications in plans and other corrective actions can be taken to avoid air quality problems at a later date.

The current F.H.W.A./E.P.A. guidelines for analysis of consistency[5] appear to require detailed air quality analysis for the long-range plan, with heavy reliance on modeling (for those areas with severe air quality problems). Such emphasis on the long-range plan may create problems for a number of metropolitan areas who in recent years have deemphasized the 20-30 year plan. Given the extremely high cost of plan development and the large degree of uncertainty in 20-year projections of basic data such as population and land use, there is widespread doubt that the development of detailed master plans supported by large-scale modeling is worth the time and cost required for preparation[6]. The widespread recognition that citizen participation in support of transportation decisions is both desirable and necessary for implementation of projects also has contributed to the increasing focus on shorter term plans and programs.[7] Furthermore, difficulties in estimating future costs and levels of funding have made it nearly impossible to formulate a realistically budgeted long-range plan[8,9]. Finally, new D.O.T. regulations[10] governing the transportation planning process reflect the increased emphasis on middle- and short-range planning horizons. In light of these shifting priorities and shortcomings of traditional long-range planning, long-range planning efforts have come to put little emphasis on placing lines on a map, concentrating instead on identifying broad transportation corridors based on varying assumptions about population, land use, etc.; on discussing different mixes of modes and levels of service for the corridors, and exploring their implications; and on setting broad policies for investment priorities. Needless to say, it is difficult to do a detailed air quality analysis on so general a plan.

Even with a long range plan developed in the traditional way, detailed air quality analysis remains difficult. Most long-range plans simply cannot have the necessary precision to permit accurate air quality determinations; that level of detail is achieved only upon completion of location, and in some cases, design, studies. Even with a highly detailed plan, inaccuracies in traffic, land-use, and population projections will make it impossible to say definitively what regional

VMT will be, and thus to predict air quality accurately. Furthermore, inclusion in the long-range plan is never a guarantee that a particular project or group of projects will be implemented at all, in the form shown, and/or within the projected time frame - political opposition or lack of funds, for example, can stop a project.

For all these reasons, any analysis of the air quality effects of a long-range transportation plan is necessarily approximate. This raises questions about how much time and money should be devoted to making air quality estimates for 20-30 years into the future. We are of the opinion that where the detailed models and plans already are developed they should be used for consistency determinations, but that the results must be recognized for what they are - highly uncertain approximations. In areas where the long-range plan is a more general goal and investment priorities-oriented document, it is not necessarily desirable to spend significant portions of the area's planning money on more detailed modeling and plan specification. Instead, we would recommend the use of sketch-planning techniques for both the traffic and air quality estimates.

Regardless of which modeling technique is chosen, it will be important to look carefully at the underlying assumptions of the plan. In fact, one of the things EPA can do to improve the long-range plan is to promote a fuller discussion in the plan of growth assumptions, anticipated funding levels and sources, assumptions about traveller preferences, anticipated problems with implementation, and so on. For example, in reviewing the long-range plan for consistency, the following questions might be asked:

- is there a reasonable discussion of the growth implications of the plan and of the anticipated changes in VMT resulting from this growth?
- has an estimate been made of the costs of implementing the plan? What would the sources of funding be and what is the likelihood that the required amont of funding would be available within the appropriate time frame? Are the implications of different levels and sources of funding adequately discussed?
- has full consideration been given to the assumptions which underlie the long-range plan, including growth projections, relative prices of different modes, and tripmaking behavior?

By exploring such questions, the agency responsible for air quality can get some idea of the long-term issues which may affect the long-range plan. The air quality agency should be raising questions about the validity of assumptions and tagging the areas where major uncertainties require that future development be monitored.

The long-range plan also should be examined for consistency of the particular elements. For example, the air quality agency should look at the balance of highway and transit projects; what is reasonable depends on the characteristics of the area - the air quality problems, the existing transportation system, etc. Any long-term measures for transportation control or air quality maintenance also should appear in the long-range plan. Finally, there should be some consideration, wherever appropriate, of operations policies for existing facilities and proposed additions.

Because many of the measures in the long-range plan may never be implemented in the anticipated time, the consistency determination should be made for several possible subsets of the plan. One way to get started is to look at sets of projects based on alternative levels of funding. Another way is to examine the no -build alternative.

The major thrust in assessing consistency of the long-range plan should be in identifying and encouraging the modification of projects or groups of projects with adverse air quality impacts, and in encouraging the inclusion of projects which could improve air quality - in general, to foster full consideration of air quality issues in long-range planning. Because the implementation of the plan is so far off, there is no real urgency to have immediate inclusion of every possible detail required for a complete air quality analysis. It is more important to show yearly progress toward full integration of air quality issues into transportation planning.

Since EPA and the air quality agencies do not have direct enforcement powers, they will have to rely on their persuasiveness to achieve full consideration of air quality in the long-range transportation plan. Consistency is determined by the MPO itself, and any deficiencies are then reviewed by the F.H.W.A. regional administrator as a factor to be considered in certification decisions. The serious implications of decertification - it basically is a negative action which may harm more than it furthers the overall interests of F.H.W.A. - make it a difficult option for F.H.W.A. to exercise. F.H.W.A. has other, more subtle methods for achieving compliance with the rules it considers most important, including jawboning - threatening to decertify or to delay approval of projects ; granting conditional certification, which puts the MPO on notice to correct the deficiencies in its planning process; and promoting these rules through constant contact with regional and state highway agencies. Divisional and regional offices review MPO planning processes for compliance with these priority rules, and frequently contact the MPO's to provide guidance when rules are not being followed. Thus, F.H.W.A. achieves a certain degree of compliance without employing a drastic measure like decertification by interacting closely with the highway planning agencies to promote acceptance and implementation. This implies that E.P.A. cannot expect to have a limited role in transportation planning by undertaking only a yearly review of documents provided by the planning agency, for example. E.P.A. must work closely with F.H.W.A. at all levels to ensure that consistency becomes a "high priority" rule in regional and divisional offices, and E.P.A. itself must interact closely with the MPO's to promote the consistency guidelines.

C. THE TRANSPORTATION SYSTEMS MANAGEMENT ELEMENT

The Transportation Systems Management Element (TSME) is a recent requirement promulgated jointly by the Federal Highway Administration and the Urban Mass Transportation Administration (U.M.T.A.)[11]. Under the regulations, the metropolitan planning organization is required to investigate ways of improving the efficiency of the existing transportation system. Options recommended for investigation include:[12]

- traffic operations improvements
- preferential treatment for high-occupancy vehicles
- improved pedestrian and bicycle facilities
- management and control of parking
- measures to decrease peak period travel

U.M.T.A., but not F.H.W.A., requires the inclusion of some T.S.M. measures in the annual element of the Transportation Improvement Program.[13]

Suggested T.S.M. measures include most of the transportation options considered appropriate for T.C.P.'s (with the exception of inspection and maintenance, retrofit, gas rationing, and other such measures not dealing explicitly with the transportation system). Furthermore, air quality is listed as one of the factors to be considered in the selection of T.S.M. measures.[14] Therefore, this new program offers considerable opportunity for fostering consistency between transportation and air quality programs.

Because this is a new program, MPO's will need considerable guidance on how to develop the T.S.M., and initial efforts at T.S.M. planning necessarily will be short on detail. For areas with transportation control plans, one way to get started would be to analyze T.C.P. measures for possible inclusion in the T.S.M.E. Consistency of the T.S.M.E. could then hinge on whether all the appropriate T.C.P. measures had been included. If one or more measures did not appear, without reasonable justification for omission, the T.S.M.E. would be found inconsistent with the state implementation plan. Reasonable justification might be:

- a measure does not come under the purview of the T.S.M.E. as defined in DOT guidelines
- no federal or state programs exist for funding the measure and development of such a funding program is unlikely
- a thorough assessment of political acceptability indicates that the measure would never be implemented
- an impact analysis indicates that the measure very likely would not achieve the desired air quality improvement and/or would have other highly undesirable effects
- another measure is substituted which would achieve the same air quality improvement.

Whether or not an area has a TCP, E.P.A. should encourage DOT to require air quality analyses for T.S.M. measures, and an adequate process for considering air quality in the T.S.M.E. should be one basis for a finding of consistency.

D. THE TRANSPORTATION IMPROVEMENT PROGRAM

The Transportation Improvement Program, prepared by the Metropolitan Planning Organization,[15] consists of:

- a 3 - 5 year program of projects listing measures from the long-range element and the transportation systems management element which are scheduled for implementation over the next 3 - 5 years (the exact length is at the MPO's discretion), and stating the implementation schedule for those projects.
- an annual element which includes a specific program of projects for the next year, with detailed information about work to be performed, estimated costs, anticipated revenue sources (which must cover projected costs), and the agencies who will perform the work.

Both parts of the TIP will include all Federally funded projects, as well as non-federally funded projects recommended from the TSME (for informational purposes).

The TIP should be reviewed for evidence that TCP measures included in the 3-C plans are proceeding toward implementation according to the schedule anticipated in the SIP. If such progress is not demonstrated, and adequate justification is lacking, the TIP cannot be consistent with the SIP. Again, adequate justification might include:

- failure to obtain anticipated project funds, due either to a lack of federal appropriations or to failure of the state or locality to vote the requisite funds
- new information about the project indicating that it may not achieve

the desired goals or may have previously unforeseen negative side effects.

It must be cautioned that the TIP is a new program and will have its share of problems. In particular, the new requirement for accurate budgeting (and therefore a realistic appraisal of work to be performed) initially may be difficult for agencies which are not accustomed to projecting cost and revenue streams. Also, political considerations may make it very difficult to prioritize and pare down the list of proposed projects in an urban area. Substantive review of this process should take place, since accurate budgeting is in the interest of both EPA and DOT. Note, however, that a small excess of cost over revenues may be desirable, so that a project cancelled for extraordinary reasons may be replaced by another project already in the annual element. We feel strongly that extensive air quality analyses should be performed on the 3 - 5 year program, because the program will have sufficient detail to support such an analysis and there is a reasonably high probability of implementation. It may be worthwhile also to look at subsets of the program, for example by deleting projects with questionable funding or acceptability.

E. PLANNING WORK PROGRAMS

The planning work programs consists of:[16]

- a unified planning work program, listing activities for which planning funds will be expended over the subsequent one or two year period
- a planning prospectus, detailing the full planning horizon for activities appearing in the unified work program.

Together these documents describe the anticipated transportation planning activities for the urban area.

The planning work programs should be reviewed for evidence that TCP measures included in the 3-C plans are moving through the planning process according to the schedule anticipated by the SIP. A lack of such progress without adequate justification would result in a finding of inconsistency. Criteria for adequate justification might be similar to those for the TSME, i.e., changes in funding, a shifting political climate, or new information about potentially adverse impacts.

F. PROJECT LEVEL CONSISTENCY

Localized impacts of highway projects often cannot be determined until the details developed in location and design are available. Therefore, it is important to review air quality impacts of specific projects in the later stages of their development. The methodologies for estimating localized air quality effects are relatively straightforward. However, determining the region-wide effects of a specific highway segment is the subject of considerable disagreement among transportation professionals.

One source of difficulty is estimating how much traffic on a proposed facility is induced and how much simply is diverted from other facilities. Proponents of a highway facility argue that most of the traffic will be diverted from lower-speed facilities and therefore will flow more smoothly and at a higher speed than previously, while opponents argue that much of the traffic will be induced and therefore will cause a large net increase in VMT and an overestimation of average speeds on congested facilities. Since air pollution generated by the facility depends on traffic volumes and average speeds, and the region-wide effects depend on levels of induced versus diverted traffic, the estimation of these effects is central to a determination of the air quality impacts of the facility. The methodologies commonly used for estimating these effects are so dependent on their underlying assumptions that they do not lend themselves to overconfidence and, while they may provide some indication of region-wide effects, they are hardly conclusive.

Another problem is that the volumes, speeds, and proportion of induced traffic depend on other developments in the transportation system. For example, traffic on a particular facility may depend on the level of transit developments and improvements to other highways in the broad corridor. Volumes and speeds also would be affected by land use developments, which may themselves be influenced by the transportation development in question. Thus, the assumptions which must be made about future developments introduce a high degree of uncertainty into estimates of regional air quality effects for a particular facility.

While we recommend that regional air quality effects be analyzed, we recognize that uncertainties in the analysis will lead to disagreements in certain cases over whether a project is or is not consistent with an area's air quality requirements. Because of this disagreement, it will be difficult to prevent the construction of some facilities with potentially adverse air quality impacts - and then prevention may be unnecessary. Where disagreements cannot be resolved otherwise, we strongly recommend that consistency be contingent upon reaching agreements to monitor the air quality effects of questionable projects and, where monitoring shows a need, to implement operating policies which reduce the air quality impacts (for example, placement of a with-flow exclusive bus lane on a highway whose actual traffic is above acceptable levels.) The results of monitoring also should be considered in updating MPO plans and programs, and in assessing the validity of assumptions and models used to predict air quality impacts.

FOOTNOTES - SECTION II

1. Clean Air Act, 42 U.S.C. 1857 et seq.

2. U.S. Department of Transportation, Federal Highway Administration, "Air Quality Guidelines for Use in Federal-Aid Highway Programs", 23 C.F.R. 770.200 - 700.206 Also published in the Federal Register, Dec. 24, 1974 (39 FR 44441-44443).

3. U.S. Department of Transportation, Federal Highway Administration, "Guidelines for Analysis of Consistency Between Transportation and Air Quality Plans and Programs", prepared jointly by the Federal Highway Administration and the Environmental Protection Agency, April 1975.

4. These comments are based on interviews and telephone discussions conducted in the Fall of 1975 with individuals from EPA Regions I, II, III, V, and IX, and on notes from a meeting on December 10, 1975 at Region IX in San Francisco, attended by EPA regional employees who are involved in consistency deliberations and who have dealt with transportation planning organizations.

5. op.cit., U.S. Department of Transportation, F.H.W.A., "Guidelines for Analysis of Consistency....", pp. 6, 7, 9-14.

6. Suhrbier, John H., and Elizabeth D. Bennett (Eds.),"Proceedings of a Panel Discussion on the Interrelation of Transportation System and Project Decisions." In consultation with U.S. Department of Transportation, Federal Highway Administration, Office of Environmental Policy, November 1, 1973.

7. Ibid.

8. Neumann, Lance, Integrating Transportation System Planning and Programming: An Implementation Strategy Approach, PhD. Thesis, Department of Civil Engineering, Massachusetts Institute of Technology, January 14, 1976.

9. See Appendices I and II for some discussion of budgeting problems.

10. (a) U.S. Department of Transportation, Federal Highway Administration, "Urban Transportation Planning", 23 C.F.R. 450.100-450.122 plus Appendix.
    (b) U.S. Department of Transportation, Federal Highway Administration, "Transportation Improvement Program", 23 C.F.R. 450.300-450.320.
    (c) U.S. Department of Transportation, Urban Mass Transportation Administration, "Urban Transportation Planning", 49 C.F.R. 613.100.
    (d) U.S. Department of Transportation, Urban Mass Transportation Administration, "Transportation Improvement Program", 49 C.F.R. 613.200, 613.202. These regulations were promulgated together in the *Federal Register*, September 17, 1975 (40 FR 42975 - 42984).

11. op. cit., 23 C.F.R. 450.100 - 450.122 and 49 C.F.R. 613.100. See especially the Appendix following 450.122 for F.H.W.A.'s interpretation of transportation systems management.

12. *Ibid*.

13. op. cit., 49 C.F.R. 613.202 (40 FR 42984)

14. op. cit., 23 C.F.R. 450.100 - 450.122 (40 FR 42978)

15. op. cit., 23 C.F.R. 450.300 - 450.320 (40 FR 42979 - 42983)

16. op. cit., 23 C.F.R. 450.114 (40 FR 42977 - 42978)

III. OTHER ASPECTS OF THE E.P.A./D.O.T INTERFACE

A. INTRODUCTION

This section examines several opportunities for increasing the coordination between planning for transportation controls and ongoing urban area transportation planning. Since better coordination among programs depends upon building sound working relations between E.P.A. and the various transportation planning organizations, emphasis is placed on those areas where opportunities exist to improve interagency cooperation.

One difficulty in integrating control planning with ongoing urban transportation planning is that T.C.P.s often include strategies such as inspection and maintenance requirements, retrofit programs, and gasoline rationing, which are not among the usual responsibilities of transportation agenices. On the other hand, because such strategies are widely viewed as onerous, there is pressure for transportation agencies to assume a greater portion of the air quality improvement burden by implementing the other common T.C.P. measures--carpooling, auto restraints, increased transit use, etc. A quick look at T.C.P.s indicates tnat many transportation agencies could, in fact, contribute more. Many T.C.P. s, for example, do not yet include all of the area's transportation activities which might be expected to improve air quality. Two factors, however, appear to make many transportation agencies reluctant to get deeply involved in T.C.P. development. Agencies fear the enforcement orientation of T.C.P.s, which state that a project shall be implemented, preferring to have the flexibility to modify, postpone, or delay a project should circumstances so warrant. Also, agencies are not anxious to be obligated to try to implement projects which have adverse effects or which are highly controversial simply because such projects would improve air quality.

Proposed changes to the Clean Air Act (see Section VI) would alleviate these problems by extending the attainment deadlines, allowing for more flexibility in strategy selection, and requiring consideration of social, economic, and environmental impacts in addition to air quality. The proposed amendments would shift the emphasis in control planning from attainment at any cost to attainment as soon as reasonably possible, a position far more palatable to transportation agencies. In addition, the proposals would allow for more attention to the process by which transportation controls are developed and selected, and thus would bring E.P.A.'s responsibilities closer in line with D.O.T.'s.

Regardless of the fate of the amendments, however, much can be done to increase E.P.A./D.O.T. cooperation. The recent F.H.W.A. - U.M.T.A. regulations calling for analysis of short-range, efficiency-oriented transportation options[1] provide a new "push" for transportation agencies to consider options which would (among other things) improve air quality. D.O.T. agencies also are placing increasing emphasis on tying together the planning, budgeting and programming of transportation improvements.

B. E.P.A./F.H.W.A. RELATIONS

E.P.A.'s relations with F.H.W.A. sometimes have been strained, but personnel in both organization note that there are signifcant areas of agreement and opportunities to enhance interagency cooperation. The need to make determinations on the consistency of highway programs and projects with State Implementation Plans requires good working arrangements between E.P.A. and F.H.W.A.[2]; and as F.H.W.A. has placed increasing emphasis on short-range, low capital transportation options, compatibility between the two organizations' programs has increased. Since F.H.W.A. is the guiding force in much of today's transportation planning and implementation, it is crucial to E.P.A. to take all reasonable steps to strengthen its relationships with F.H.W.A. The discussion below identifies some of the problems which have arisen in E.P.A.'s dealings with F.H.W.A. and points to areas where coordination could be increased.

One of the most commonly voiced criticisms of E.P.A. is that, in many regions, E.P.A. personnel simply haven't established sufficient ties to the transportation agencies, whether federal, state or local. Many F.H.W.A. personnel feel that the majority of E.P.A.'s difficulties with transportation agencies stem from this lack of contact and the resulting misunderstanding rather than from inherent, unresolvable conflicts.

In dealing with F.H.W.A., E.P.A. regions occasionally have run into difficulty because they do not fully understand the relationships between F.H.W.A. region and division offices. The responsibilities and degree of autonomy of the division offices vary considerably from region to region and state to state; in any event, E.P.A. must coordinate with both levels. In one state, members of the division office staff remarked that E.P.A. never consulted them until E.P.A. wanted their ratification and support; E.P.A. never sought advice from the division but (as one member of the division office put it) "preferred to go over [division personnel's] heads to the F.H.W.A. Regional Office." The division personnel were only mildly offended by this, but did feel strongly that since they dealt with the state and local transportation agencies on a day to day basis (whereas the region office had much less contact with those agencies), E.P.A. was ignoring a major opportunity to influence transportation planning. In another area, the E.P.A. region dealt almost exclusively with the F.H.W.A. division office and the state and local agencies on consistency matters, then asked the F.H.W.A. region to consider decertification--a request that came out of the blue, so far as the F.H.W.A. region knew!

F.H.W.A. personnel also have expressed concern that some E.P.A. offices actually try to minimize their contact with state and local transportation agencies, and then, when decisions are imminent, come forward with objections or proposed modifications. The E.P.A. offices have argued that they have no alternative, since they do not have enough staff to stay in weekly communication with all of the transportation agencies in their multi-state regions. Even so, criticisms raised very late in the planning and decisionmaking process usually are ignored, simply because it is so difficult and expensive to make changes when a study is nearly complete. More important, a number of transportation agencies have voiced strong resentment over this E.P.A. practice, feeling that this is an unfair and unwarranted tactic. It is strongly recommended that E.P.A. regional offices make clear assignments of responsibility to staff members for maintaining contact with the transportation agencies of the region--not just the federal and state organizations, but also the M.P.O.s and (to a lesser extent) major transit agencies and even the large municipal transportation staffs. To the extent possible, transportation liaison should be a full time position for one or two persons in each region, since when an assortment of E.P.A. people are dealing with various aspects of transportation, not only is it difficult for persons outside to determine who at E.P.A. should be contacted, but E.P.A. itself loses a lot of information and diminishes its ability to deal effectively in transportation.

A final point is that the Federal Highway Administration and most state highway agencies are proud of the fact that they have developed procedures for public participation and analysis of social, economic, and environmental effects of their plans and projects. A frequent complaint is that E.P.A. personnel appear not to recognize highway planners' achievements in protecting the environment and in fostering multi-objective highway planning. Some highway personnel counter that in striving to improve air quality, E.P.A. has ignored the potentially adverse effects some of its proposals would have. It is in E.P.A.'s interest to recognize and build upon the accomplishments of highway agencies in developing environmentally sensitive transportation planning processes and, so far as possible within its legal mandate, to consider the full range of effects of proposed transportation control measures in selecting those to be implemented.

C. E.P.A./U.M.T.A. RELATIONS

The Urban Mass Transportation Administration shares many objectives with E.P.A. U.M.T.A. funds for capital and operating expenses, both for conventional bus and rail transit and for innovative forms such as Dial-A-Ride, have brought about a resurgence of interest in public transportation in American cities. The Administration's goal is to encourage greater use of public transportation throughout the United States through development of new transit systems and services, upgrading and renovations of existing systems, and improvements in transit management and operations. In addition, U.M.T.A.'s mandate to increase transit efficiency has led to greater interest in preferential treatment for high occupancy vehicles, exclusive rights-of-way for transit vehicles, and other traffic management measures which increase the competitiveness of public transit vis-a-vis the automobile.

Despite this emphasis on improving transit, results have been slow in coming. At the federal level, appropriations have not kept pace with local needs; requests under most programs far outstrip available funds, so that many localities are disappointed in their efforts to improve transit. At the local level, rarely is there a continuing source of funding producing large enough revenues to meet matching share requirements, and so funds must be raised through bonds--which voters have been turning down lately. Furthermore, operating costs still are primarily a local responsibility, and, given the massive deficits incurred by many transit systems, local governments and taxpayers are wary of entering or expanding their roles in the transit business.

Institutional and legal problems also hamper transit service delivery. In many areas, laws and regulations and labor contracts limit the types of service that can be provided. In some areas, transit union rules against split shifts make it infeasible to increase commuter services, since off-peak demands cannot support a large work force. In other areas, work rules prevent the operation of Dial-A-Ride systems; and state courts have held that government-operated Dial-A-Ride and jitney services constitute unfair competition with taxi operations. Some areas also have difficulty in obtaining certificates of necessity and convenience for flexible bus routing. Management attitude and practices also can slow transit improvements. Many transit organizations are so used to having to fight for survival that the idea of entering new markets and trying new kinds of service is frightening to them. The very complexity of the institutional structure for transit also can make it difficult to change transit practices. In some metropolitan areas, transit is provided, in part, by private companies and, in part, by one or more public authorities; simply getting routes and schedules properly coordinated is a major accomplishment.

Under these circumstances, U.M.T.A. has learned that the only way transit improvements can occur is through a lot of hard work by everyone involved and a willingness to accept gradual progress. U.M.T.A.

officials recognize that E.P.A.is a potential source of support for transit improvements, but have voiced concern that some E.P.A officials have not always recognized the delicate balance in which most transit achievements hang, have expected too much too soon, and have not developed a sufficient understanding of transit problems. Therefore, while U.M.T.A. is anxious to increase its dialogue with E.P.A. and to improve coordination between E.P.A. and U.M.T.A. programs, it is cautious about openly joining forces with E.P.A.

In one case, for example, the regional U.M.T.A. office had prodded the local transit agency for months to investigate ways of increasing operations efficiency. After a series of negotiations, the transit agency reluctantly agreed to perform a small study. U.M.T.A. viewed this study as a major victory despite its modest proportions and aims, since it was the first sign of transit agency willingness to consider non-capital improvements in a systematic way. When the topic was raised in the Intermodal Planning Group meeting, however, the E.P.A. representative - who knew nothing of the previous negotiations - expressed doubts about the usefulness of the proposed study and questioned the priority being given it. The transit agency used E.P.A.'s lack of support as an excuse to back out of the study. This incident seriously damaged U.M.T.A./E.P.A. relations.

U.M.T.A. officials also have expressed their willingness to work with E.P.A. to coordinate the new Transportation System Management

Element with T.C.P. requirements. This is particularly auspicious for E.P.A., since U.M.T.A. (but not F.H.W.A.) is requiring programming of T.S.M. measures. U.M.T.A. officials are concerned, however, that E.P.A. will press for every T.C.P. measure to be included in the T.S.M.E., even when there is serious local objection to a measure. Since the T.S.M.E. requirement is new and controversial, U.M.T.A.'s preferred strategy is to give areas time to develop competence in short-range planning and not to require a sophisticated product the first round; too many demands, it is feared, could sink the program.

Finally, even though U.M.T.A. legislation and other federal laws would imply that coordination with E.P.A.'s programs in particular and air quality in general should be factors in transit decision-making,[3] U.M.T.A. officials are extremely reluctant to see this link become as explicit as F.H.W.A.'s "consistency" requirements. U.M.T.A. personnel are concerned that if E.P.A. were given a major role in transit decision-making, air quality benefits would be maximized to the detriment of other U.M.T.A. objectives.

In short, then, U.M.T.A. has shown a willingness to cooperate with E.P.A. and to promote coordination of E.P.A. and U.M.T.A. programs. U.M.T.A. is wary, however, about E.P.A.'s single objective orientation and its inexperience in dealing with transit problems. E.P.A. could minimize some of U.M.T.A.'s concerns if E.P.A. regional offices would devote more attention to developing a practical understanding of the transit organizations, transit objectives, and transit problems in the areas they deal with. But E.P.A. must recognize and respect the fact that transit objectives and U.M.T.A.'s responsibilities are not limited to air quality improvement.

D. THE INTERMODAL PLANNING GROUP

The Intermodal Planning Group (I.P.G.) was established to coordinate decision-making among the Department of Transportation's modal agencies and, to a lesser extent, among D.O.T. and related federal agencies.[4] E.P.A. is an ex officio member of the I.P.G. both at the federal and at the regional levels.

The I.P.G. provides an established, formal opportunity for considering transportation decisions which involve or affect more than one federal agency. At the regional level, the I.P.G. should deal principally with M.P.O. plans and programs, providing guidance on the various processes and documents required under federal regulations and resolving disagreements among federal agencies over interpretation of those regulations. However, in many areas, most of the discussion and negotiations on what metropolitan transportation agencies should (or can) do goes on through informal channels. Thus, the I.P.G. meetings represent only a small portion of the basic dialogue behind transportation decision-making. For E.P.A. to be effective, it must develop the same informal lines of communication and keep abreast of interagency discussions as they take place. In fact, to the extent that the I.P.G. meeting merely ratifies informally reached decisions, it is too late for E.P.A. to try to make changes; E.P.A. will have more influence through the informal channels.

In working with the I.P.G., E.P.A. Regional Offices must consider carefully the manner in which they assign staff to transportation responsiblities. Not only should one or more employees be assigned full-time to transportation issues and given clear instructions to keep in contact with all the relevant transportation agenices, as discussed in part B of this section, but the same person(s) should attend the Intermodal Planning Group on a regular basis.

E. PROCESS GUIDELINES AND ACTION PLANS

The Process Guidelines[5] were developed in response to Section 109(h) of the Federal-Aid Highway Act of 1970, which requires that full consideration be given to social, economic, and environmental effects throughout the planning of highway projects, including system planning, location, and design. The guidelines, which apply to both metropolitan area and statewide planning, require each state to operate under an approved Action Plan which describes assignments of responsibility and procedures to be followed in planning and decision-making. Topics covered in Action Plans include the consideration of alternative courses of action, involvement of other agencies and the public, identification of social, economic, and environmental effects, the systematic, interdisciplinary approach requirement, and the decisionmaking process.

Several provisions are of particular importance to E.P.A. and state and local air quality agenices. For example, one section of the Guidelines requires the state to provide for monitoring the environmental effects of completed projects, as appropriate;[6] this could provide an opportunity to see that highway sections are monitored where there is debate over air quality effects and VMT. Other sections are concerned with the role other agencies play in the development and analysis of alternatives and in decision-making,[7] and thus could provide explicit procedures for E.P.A. and air quality agency participation.

It is recommended that E.P.A., in cooperation with state air quality agencies, review Action Plans to identify and assess the commitment each state has made to air quality analysis and monitoring; to coordination with air quality agencies; and to the inclusion of air quality as a factor in decision-making. Since at the time Action Plans were written, most highway agencies' programs were oriented toward the location and design of major highways, the technical procedures, impact assessment methodologies, and participation programs may be directed primarily to such large-scale actions. Now that many highway agencies are finding that an increasing percentage of their activities is directed toward shorter-term, lower capital transportation measures, and particularly in light of new requirements for short range planning, it may be appropriate for highway agencies to revise certain sections of their Action Plans. E.P.A. and the state air quality agencies may wish to suggest such revisions to the state; or E.P.A. may wish to suggest to F.H.W.A. that Action Plans should be revised to reflect recent requirements in air quality and energy consideration and short-term, low capital transportation planning.

FOOTNOTES - SECTION III

1. Transportation Improvement Program, U.S. Dept. of Transportation, Federal Register, Vol. 40, No. 181, Sept. 17, 1975.
2. See Section II for a full discussion of consistency.
3. See, e.g., the National Environmental Policy Act of 1969; the Intergovernmental Cooperation Act of 1968; and 49 U.S.C. 1604(h)(2) and 1604(i).
4. Department of Transportation, Office of the Secretary Order 1130.1, 11-30-72.
5. 23 C.F.R. 795; Federal Register Vol. 39, No. 232 - Monday, December 2, 1974, pp. 41819 *et seq*.
6. 23 C.F.R. 795.8(b)(1)(iii)
7. For example, 23 C.F.R., §795.8 (b)(2)(iv), 795.9 (b)(5); 795.12 (b)(1).

IV. TRANSPORTATION CONTROL PLANS

A. INTRODUCTION

Transportation control plans currently are in effect in some 30 air quality control regions. Although the plans were expected to reduce ambient levels of auto-related pollutants to the national standards by 1977 at the latest, slow implementation of TCP measures and lower than estimated effectiveness have made it clear that 10-15 regions will not meet the standards by the current deadline.[1] Amendments to the Clean Air Act which would permit delays in attaining the standards are before Congress;[2] in any event, however, E.P.A. anticipates that revisions to T.C.P.s will have to be initiated some time in 1976. Thus, it is appropriate to investigate the potential for using T.C.P. revisions as an opportunity for increasing the coordination between control planning and the ongoing transportation planning process.

There are two major ways to build stronger links between transportation control planning and other transportation planning efforts. One is to maximize the number of shared elements of the various plans; in particular, the T.S.M.E. holds much promise for compatibility with the T.C.P. Another way is to make the process through which transportation control measures are analyzed and selected compatible with the already established process for continuing metropolitan transportation planning. Thse topics are discussed below.

B. T.C.P.s and T.S.M.E.s

The new F.H.W.A./U.M.T.A. requirement that M.P.O.s develop transportation system management elements (T.S.M.E.s)[3]-- comparatively low-cost, short-range transportation measures with the potential for increasing system efficiency--will lead to planning very like that required for T.C.P. development. But D.O.T. officials recognize that most M.P.O.s will have difficulty in getting started and will need guidance. E.P.A. has a real opportunity to influence D.O.T.'s thinking on what the T.S.M.E. should include, since D.O.T. is in the midst of formulating its own ideas on what the new requirement actually means.

We recommend that E.P.A. urge F.H.W.A. and U.M.T.A. to adopt the position that where T.C.P.s exist, the first step in developing the T.S.M.E. should be to analyze all appropriate T.C.P. measures. F.H.W.A. and U.M.T.A. could require that the T.S.M.E. include an analysis of the transportation, social, economic, and environmental--including air quality--effects of the T.C.P. measures. The T.S.M.E. then should include all acceptable T.C.P. measures.

If certain T.C.P. measures are rejected after a thorough analysis, the next step for the M.P.O. would be to explore new measures from among those suggested in the appendix to the joint regulations.[4] These measures should be analyzed for their potential air quality benefits, and such benefits should be one criterion in selecting measures.

In T.C.P. areas one element of the consistency determination[5] with regard to the T.S.M.E. should be that the T.C.P. was carefully analyzed; that acceptable measures were approved and recommended for programming, as appropriate; that the reasons for not including certain T.C.P. measures in the T.S.M.E. were fully explained; and that the air quality effects of other T.S.M.E. elements were analyzed and fully considered in deciding to include them.

In areas which do not have T.C.P.s, one way to get started on developing the T.S.M. would be to develop simple measures which can have air quality and energy benefits as well as transportation system efficiency benefits. A prime example is carpooling--every metropolitan area should be able to develop some form of carpooling program, although the program's sophistication may vary markedly from area to area. Areas also could be expected to do careful analyses on preferential treatment of high occupancy vehicles; to review the impacts of their parking policies and to consider ways of favoring short-term users (e.g., shoppers) over commuters; and to consider the effects of traffic operations improvements. Air quality analysis should be a prominent component of the studies.

In all areas, whether or not they have T.C.P.s, E.P.A. should urge the development of a sound process for air quality analysis and consideration in decision-making as part of T.S.M.E. planning. The existence of such a process, and the explicit reflection of air quality goals in the plans which result, should be a measure of consistency of the T.S.M.E.

E.P.A. also should urge the U.M.T.A. and F.H.W.A. to require that the T.S.M.E. reflect involvement of, and information exchange with, other agencies and the general public, to increase the likelihood that the TSME will be implementable. Furthermore, E.P.A. should lend its support to the D.O.T. administrations in urging that the M.P.O.s plans reflect a careful analysis of implementation issues, including budgeting and required levels of intergovernmental coordination.

It is also recommended that E.P.A. monitor the development of the T.S.M.E. in cities having T.C.P.s. Problems arising in developing a T.S.M.E. should be indicative of the problems likely to arise in the development of any short-range, efficiency-oriented transportation program--including T.C.P. revisions. By following the T.S.M.E. development closely, E.P.A. would be able to encourage the M.P.O.s to pay more attention to air quality issues, and would gain experience and insight into how transportation control planning ought to be conducted.

C. IMPROVING THE T.C.P. PLANNING PROCESS

1. Introduction

Early transportation control planning efforts were under stringent time constraints, and often proposed the use of measures that were new to transportation planning practice. Given the short time frame and the lack of information about specific options, most of the early transportation control plans simply enumerated strategies to be applied; they did not include information about financing, implementation, enforcement and evaluation of the strategies. Problems in implementing T.C.P.s quickly pointed out that this latter information was crucial. Developing this information, however, is not a straightforward task. Even though technical information is available about the measures commonly included in T.C.P.s, the major problem--how to develop a coordinated program of short term measures--is still not solved. Current transportation planning procedures are oriented primarily toward long-range, high-cost measures for which large expenditures of time and money are feasible--such procedures often are not transferable directly to short-range planning. This problem no longer is unique to EPA, since the Department of Transportation has made requirements for consideration of similar short term measures a part of its urban area transportation planning regulations.

The following discussion explores some of the major issues which must be addressed in the development of a process for the planning of short range transportation management options, from the viewpoint of transportation control measures.

2. Basic Issues

A variety of transportation control measures have been included or proposed for inclusion in transportation control plans. Most of these measures initially received attention because they were judged to be short range options which would reduce emissions per vehicle mile travelled, reduce vehicle miles travelled, and/or increase the efficiency of traffic flow, thus decreasing total emissions. Most of these measures are non-capital intensive, and planning and designing their operational features is relatively straightforward from a technical viewpoint. Experience in the formulation of T.C.P.s has indicated, however, that institutional and political factors (and not technical ones) may be predominant in determining both what effects the measures have, and when those effects will occur.

While it is *a priori* possible to state that some options are *not* short range (e.g., major highway and transit construction), it is impossible to determine without a certain amount of study whether other transportation options, which *could* be short-range, can in reality be put into effect quickly.[6] Furthermore, even measures which *can* be started up quickly may not be effective for significant amounts of time. For example, a freeze on parking in the core area has been included in the Boston T.C.P. It is a simple matter to declare that the number of parking spaces in downtown Boston cannot exceed those in existence as of October, 1973, and in that sense, the parking freeze is both quickly implementable and would _seem_ to be immediately effective. It turns out, however, that Boston has numerous outdated and underutilized parking facilities within the core area. These spaces are being "banked," to be eliminated as new developments requesting parking come along. This practice will permit effective _increases_ in the city's parking capacity for a number of years. Thus, the freeze will have no effect on transportation until all the city's outmoded parking has been traded off for new development--something not expected to occur for several years, making the freeze in a sense a long range measure.

In this example, we have a measure which can be implemented in the short-run, but will yield results only in the long-run. A second case might be auto-free zones, which theoretically could be implemented in the short run, but may in fact be _infeasible_ in the face of organized opposition by local businessmen.

The fact that institutional considerations and political realities may convert an apparently short-range option into one that can be put into effect only after long effort, if at all, necessitates that the planning process incorporate judgments on the feasibility of implementing each option and on the length of time needed to bring it to fruition. Such judgments hardly are easy to make. Former Massachusetts Secretary of Transportation and Construction Alan Altshuler notes, for example, that during the first formulation of the Boston Transportation Control Plan judgments on the acceptability of options were made by a few men sitting in a closed room and that these judgments always seemed sound--until they had left the room and entered the larger political arena outside.

It is precisely this need to make judgments which will withstand the critical inspection of the entire political arena which necessitates the adoption of a process orientation for the formulation of transportation control plans. Only through consultation with a wide range of people can sufficient information be obtained about control measures to facilitate reasonably sound judgments which can stand up to public scrutiny.

Although the information base on transportation control measures has increased significantly since the formualtion of the first T.C.P.s, most of the information is technically oriented and while necessary, is insufficient for decision-making. Some information is being developed on the effects of T.C.P. measures in communities where such measures have been tried, and while such information is indicative of likely consequences elsewhere, community variations and differences in the measure's implementation must be accounted for. Likewise, brainstorming sessions by decision-makers, although excellent for developing lists of alternatives and likely impacts, do not by themselves allow for adequate consideration of the viewpoints of those who would be affected by the measures.

It is only through consultation with people--which is the "essence of the planning process"--that information necessary to evaluate a given option can be obtained.[7] This consultation assumes critical importance when implementation of the plan will not be carried out by the agency which formulated the plan, as is often the case with T.C.P.s.

More specifically, the objective of the transportation control planning process should be to develop, through interaction with a full spectrum of affected groups, information on:

- How each measure stands on the group's list of priorities and why this measure would or would not be supported. A state official in Massachusetts who played a central role in the formulation of the Boston T.C.P.s has stated that T.C.P. elements which are successfully implemented are those that can stand on their own. The air quality impacts of these measures are not major considerations in their attractiveness to local governments. Thus one of the most important things to be done in transportation control planning is to carefully select those measures which meet multiple objectives (e.g., which increase transit level of service while improving air quality) and support community goals (e.g., which increase bicycle safety).

- How each measure would work. Many of the measures proposed for inclusion in T.C.P.s are so innovative that even the operational details are not well understood. For example, the mechanics of implementing staggered work hours in an area of a city (as opposed to just one company) are poorly defined. Even when the measure is a more familiar one, however, the impacts may not be determinable without a careful delineation of specific details of application and administration. The parking freeze example (above) illustrates this need.

- The locus of responsibility for implementation, operation, and enforcement. This task is made more difficult by the recent origin of many transportation control-type measures. For many measures, appropriate lines of responsibility are unknown and the resulting uncertainties are many. Where assignment of responsibility is uncertain, implementation is easily evaded. For example, if a measure is unenforceable it may be infeasible. Where changes in legislation are necesary, implementation of a measure may be delayed for several years.

Many of the problems currently associated with the implementation, operation and enforcement of control measures may ease up as institutional responsibilities are delineated through experience with short-range options.

- Who will pay for the measure. If there is not a currently budgeted source of funds, what is necessary to obtain funding? Is there funding for implementation, operation, and enforcement as well as planning? What, if any, are the tradeoffs that will have to be made if the measure is approved? These questions must be answered if the result of the planning process is to be realistic.

In Cambridge, for example, some of the elements included in the EPA-developed T.C.P. were on-street parking control measures. The Director of Traffic and Parking attempted to get EPA funding for inventories, and later for implementation and enforcement of the parking programs. EPA turned down all requests from Cambridge to fund the parking program, and apparently told the Director of Traffic and Parking that the parking control measures should be funded out of revenues from parking tickets. Since Cambridge was using those revenues to fund construction of a municipal parking facility, the Director was placed in the position of having to split revenues between a pet project and the parking controls promulgated by EPA. It is not difficult to guess which project had first priority.

In Boston, the enforcement of the residential permit program, another parking measure included by EPA in Boston's T.C.P. is currently piecemeal or non-existent. The Boston Department of Traffic and Parking cannot use ticket revenues, since it receives all of its monies from the General Fund, and 25 additional meter maids plus an appropriate number of supervisors and equipment are estimated to be necessary for proper enforcement of the program. Whether or not the Department receives money for the meter maids depends on a complex set of political factors which is influenced only in part by pressure to see the program enforced.

3. Prospects for Short-Range Transportation Planning by Regional Agencies

During the course of this study, both E.P.A. and D.O.T. have acted on the evolving conviction that major responsibility for planning short range transportation measures should reside with regional planning agencies. Proposed amendments to the Clean Air Act would shift considerable authority for Transportation-related air quality planning from the states to the regional agencies; F.H.W.A. and U.M.T.A. recently issued joint guidelines which require regional agencies to develop short range transportation option planning and programming abilities. These developments reflect an awareness that many transportation measures, such as exclusive bus lanes and bikeways, are regional or local in scope and impact, and should be planned and implemented by regional and local agencies, not in remote levels of the state and federal government.

The logcial agency to undertake this planning is the existing metropolitan organization responsible for regional transportation planning--the Metropolitan Planning Organization (M.P.O.). The advantages of M.P.O. planning of these measures are several:

- it utilizes all of the resources of the existing transportation planning agency, including established procedures for public participation, an existing data base, in-house analytical capability; contacts with other regional and local planning programs, contacts with local enforcement agencies, and available planning funds;

- it prevents wasteful duplication of transportation planning efforts and avoids the problem of coordinating parallel planning processes.
- it provides for the consideration of *local* interests and goals in plan formulation; and
- it opens the TCP measures included in the regional transportation plan to a wider range of potential funding.

However, concern exists that the benefits expected from increased regional agency responsibilites may not be realized. Interviews with officials in the case study cities have indicated that there is considerable desire to minimize institutional problems which might occur while regional planning agencies develop expertise in short range transportation planning. In no case was there concern that plans--that is, the actual *documents*--could not be produced; there was concern, however, that the content of the plans would not meet the expectations of Washington. A common opinion is that initial short-range plans would be quickly assembled by excerpting from existing documents--barring a major effort by, and new funding from, the federal agencies, the short range plans simply would *not* be the results of fresh, new planning efforts.

The fact that regional planning agencies are currently oriented toward long range planning seems to be the largest obstacle in limiting their ability to effectively develop short range transportation measures. The effect of the difference in time horizon between the two types of planning is more than semantic, since the whole group of analytical tools that planners have developed over the years is oriented toward long range predictions of growth and impacts, and is simply not suitable for the short range type of planning envisioned by E.P.A. and D.O.T. In addition to the fact that methodologies and therefore the data base for long range planning cannot be readily adapted to short term planning use, this shift in time horizon necessitates the use of different planning techniques, and as a result will radically change the job definitions of individuals in the agency who are (re)assigned to short-range planning. Many of the concepts behind T.C.P. measures are very different from the philosophy that has supported most of transportation practice. Transportation practitioners are accustomed to planning facilities to meet projected demands, whereas some transportation control measures are proposing the use of fixed facility size to limit or control demand. These are not insurmountable problems, but it should be recognized that the solution involves a reorientation of individual and agency mission from maximizing mobility to helping achieve a wide spectrum of governmental goals through sensitive design and management of the transportation system. The addition of short range capability to a regional agency will require a certain amount of institutional change, and as such probably will encounter some of the resistance that typically is associated with change in organizations.

An argument that is often used in favor of combining long range and short range capability in the same organization is the beneficial impact of having the two programs in close communication. However, the fact that two programs are physically managed within one agency does not insure that they are adequately coordinated. For example, a staff memeber of Boston's Central Transportation Planning Staff (C.T.P.S) whose employees are on the Metropolitan Area Planning Council (M.A.P.C.) payroll, says that no communication exists between the people in M.A.P.C. who are working on §208 water qualtiy studies and those who are working on transportation in C.T.P.S. Not even data is shared, even though both programs need the same information on land use, population, industrial and commerical development, etc. Whether more communication will occur between transportation groups doing far different work is uncertain; but it is likely that a major effort will be required to coordinate the programs regardless of shared agency ties.

Perhaps the most complex transitional problems that can be expected to arise as regional agencies undertake short range planning inolve determining the appropriate working relationships with other agencies having short range transportation planning responsibilities, such as transit agenices, highway departments and local traffic engineering departments. Specifically, there is uncertainty about whether the regional agency's work could or should substitute for the work of agencies which have had traditional responsibility for the planning of some short range transportation measures. In Boston, the C.T.P.S.'s efforts in short range planning are viewed as a supplement to the work done by the traditional planning agencies. In fact, one C.T.P.S. official says that regional agencies should plan only for those short range transportation measures which have impacts of regional significance, because regional agencies lack the resources necessary to do all areawide short range planning. Thus, his position is that the primary role of the regional agency should be to act as a coordinator of the continuing efforts of the agencies traditionally having responsibility for each area. Determining what projects are regional is no simple matter, however; and even if agreementis reached on this, the regional agency's responsibility to iron out conflicts is no easy one. Furthermore, *inaction* on the part of local agenices can have far-reaching, serious effects, even if the ignored responsibility is one assigned to the local level--and what can the regional agency do in such cases? The problems become more complex when other organizations with regional transportation responsibilities--e.g., a transit authority or parkway commission--continue to operate, in parallel with the M.P.O. The relations among these agencies may be strained, and often even legal responsibilities are confused. The only apparent solution involves careful and detailed negotiation among the agencies to reach agreement on assignments of responsibility, an overall policy, and how the inevitable disagreements on specific issues will be resolved.

Even after the regional agency's responsibilities are delineated, it still may lack the political clout necessary for successful short range transportation planning. Precisely because they are the planning arms of voluntary organizations, regional agencies (in general) have no authority to implement or enforce plans, and must rely on member governments to carry out plans which are developed. Thus there is a tendency for regional agencies to be dominated by the desires of the municipality most ready to withdraw its membership. The most effective sanction which can be made available to regional agencies appears to be the ability to withhold federal planning monies which are distributed through the voluntary organization to local governments.

To some degree, regional decision-making is opposed by all levels of government except the federal government. The regional agency must co-exist with older governmental units which may acknowledge few valid reasons for its existence. Several officials interviewed were concerned that the regional transportation planning process, although it has improved substantially in the recent decade, still does not always reflect local interests and goals, often because of lack of participation of members of the individual locality involved. They feel that the regional planning process may not be receiving enough local viewpoints to adequately develop goals and objectives which are truly representative of the region. The assumption by regional agencies of new responsibilities in short range transportation planning may have the effect of adding fuel to the fire in areas where the increased emphasis on regional-level responsibility already is resented.

These problems are not necessarily shared by all regional agencies, nor are they necessarily of such a magnitude that they seriously limit the ability of regional agencies to effectively plan for short range transportation options. However, one regional U.M.T.A. official has stated that many regional planning agencies already have undertaken all the short term transportation planning they currently are capable of, that the development of this existing planning capacity has been slow and arduous, and that short range planning capabilities must be developed before the regional planning agencies can fulfill increased responsibilities.

4. Summary and Recommendations

The transportation/air quality planning process is the prime determinant of the quality of the plans it produces, their political acceptability, and their potential for full realization. A satisfactory planning process must recognize uncertainty in the data it works with and in the efficacy of the projects and programs intended to achieve the desired results; it must be flexible enough to accomodate and adjust to new information and changes in conditions; and yet it must be decisive: implementation of proposed projects and programs must occur.

Because of uncertainties and the need for flexibility, there must be procedures to modify plans (both the parts proposed and the parts already being implemented, should the latter not be achieving satisfactory results.) In order to do this effectively,

- information is needed on all major occurrences which may affect the planning process;
- existing programs should be evaluated periodically to determine their effectiveness and to identify their impacts.

Many potentially promising strategies, projects, and programs may be time-consuming and costly to plan adequately and to implement. Therefore, a strategy of implementation in stages may be desirable. Finally, the decision-making process must consider who is going to pay for implementation and who is responsible for implementation and enforcement; it should consider social and economic factors in studying alternatives, and it should insure that public agencies, private interest groups, and the public in general have been informed and encouraged to participate in the selection of measures.

It is recommended that E.P.A. encourage each agency conducting transportation control planning to develop and document a suitable planning process. The agency should identify procedures and assignments of responsibility for

- the identification and consideration of alternative courses of action;

- identification of social, economic, and environmental effects of the alternatives;
- involvement of, and information exchange with, other agencies, the general public, and affected interest groups throughout the planning process;
- coordination of transportation control planning with other ongoing planning processes, and resolution of conflicts among programs;
- monitoring the effects of T.C.P.s as they are implemented;
- revising T.C.P.s to reflect changes in conditions or new information.

The agency also should identify:

- the process of reaching decisions on air quality strategies, and the authority and responsibility, if any, which other agencies or officials can exercise over decisions;
- sources of funding and other resources for planning and for implementation, including any interagency agreements for sharing such responsibilities.

In addition, it is recommended that each transportation control plan should

- discuss the proposed short- and long-term projects and programs to achieve air quality;
- evaluate these projects and programs as to their social and

economic effects, public comment, etc;

- indicate responsibility for planning and implementation (e.g., what agencies);
- list sources of funding and other resources available for planning and implementation;
- discuss alternatives which were considered in developing the plan and summarize their costs and benefits;
- make a definite implementation commitment for the next time period, indicating specific responsibilities and funding sources;
- indicate what will be investigated or planned for over the next period, with responsibilities, funding sources, etc., spelled out;
- indicate what long-term planning activities will be going on;
- state what will be done should monitoring show that the implemented programs are falling short of goals.

While pursuing these specific recommendations on the planning process and plan content, E.P.A. also should consider:

a) working with F.H.W.A., U.M.T.A. and other federal agencies as appropriate to assist the metropolitan planning agencies in developing short range transportation planning capabilities.

For any E.P.A. transportation programs in which regional planning agencies will play a significant role, the Agency should provide for transitional guidance and assistance. Such transitional support could include, in addition to regular support funds and guidance, such programs as:

- a review and explanation, for all regional agency personnel working in transportation, of laws, regulations, judicial decisions, and administrative procedures which are relevant to short range transportation planning.
- training in air quality quantitative techniques for short-range measures where such capability is deemed desirable by the regional agency. This might be accomplished through courses held at Durham, special regional short courses, or evening courses at a nearby university.
- research, possibly jointly sponsored with D.O.T., to develop planning methodology appropriate for the analysis and evaluation of short range transportation measures.
- dissemination of information about short-range measures gained through experience with T.C.P.s.

b) giving state, regional, and local agencies an affirmation of continued interest in transportation control planning.

This reaffirmation that transportation control plans and air quality impacts of transportation remain important to E.P.A. is especially desirable at this time because transportation control plans are reaching or have already entered the implementation stage. The states, while legally required to implement the plan, cannot be expected to place a high priority on T.C.P. implementation if E.P.A. itself does not demonstrate that T.C.P. implementation is a high prioirty issue.

FOOTNOTES - SECTION IV

1. See Bennett, E. D., G. Harvey et al., "Transportation Control Plans: The Potential for Improving State and Local Decision-Making," report prepared for E.P.A. by the M.I.T. Center for Transportation Studies, March 27, 1975.

2. See Section VI.

3. 23 C.F.R. 450. - 100 - 450.122.

4. Appendix to 23 C.F.R. 450.122.

5. See Section II.

6. Bessey, May, "What is a Short Range Transportation Option?", M.I.T. discussion paper, September 1975.

7. Altshuler, Alan, The City Planning Process, Cornell University Press, Ithaca, N. Y., 1965.

V. PARKING MANAGEMENT PLANS

A. INTRODUCTION

This discussion deals with a number of problems that have been encountered in parking management planning under the currently suspended EPA regulations. We feel that parking is an element of an area's transportation system, and as such should be included as an item to be controlled in managing transportation to meet air quality goals.

The term parking management refers to both on-street and off-street measures, except as specifically indicated. The following list includes many of the parking controls or measures which have been proposed for use in various cities:

Rate controls

- parking tax
- parking surcharge
- increased rates for parking
- changed rate structure to favor short term parking in business and commercial areas

Supply controls--off street

- freeze on off-street spaces in specific area (number of spaces not to exceed those in existence as of certain time)--suitable for areas having just enough or a small amount of excess off-street capacity at time of freeze

reduction of off-street spaces--suitable for areas having far too
  much capacity
restricted growth--suitable for areas needing additional off-
  street capacity

Supply controls--on-street
  ban parking in certain areas (at certain times) eg. an on-street
    ban, or auto free zone
  meter all on-street spaces in business and commercial areas
  limit meters to 1 or 2 hours
  residential permit program--parking in mixed residential-business
    areas limited to residents only on residential streets

Additional measures
  priority parking for carpools
  park-ride lots for transit
  fringe parking with employer or special shuttle to work
  variety of measures to improve bicycle commuting
  variety of measures to increase transit attractiveness

This section begins with a discussion of the institutional framework for parking management which explores various parking controls and the levels of government responsible for them. The discussion is followed by brief case studies of parking management in Cambridge, Boston, Los Angeles, and San Francisco. The case studies explore many of the institutional issues raised in the first discussion, and bring out numerous other considerations which have an impact on the effectiveness of parking management. Conclusions and recommendations are based on insights from the discussion of institutional issues and the case studies.

B. INSITUTIONAL CONSIDERATIONS IN PARKING MANAGEMENT

1. The Emergence of Parking as a Regional Transportation Issue

a) Traditional Treatment of Parking

Parking always has been primarily a matter of local concern. In most states, the cities and towns are empowered, through zoning, building codes, and other such mechanisms, to regulate parking supply, both directly and through various incentives. In addition, cities and towns have direct control over most on-street parking and over many off-street lots through municipal parking authorities. The focus of local parking management through these programs has been on ensuring an adequate supply of parking; i.e. ensuring that new developments provide enough parking for the auto travel they will generate and that sufficient parking is provided to maintain the competitiveness of existing retail and commercial establishments.

In certain cases, metropolitan or state agencies also have control over parking (e.g. MDC control over parking on certain major roadways in the Boston metro area), but their policies invariably have aimed at achieving narrow agency goals (such as MDPW park and ride facilities for transit use).

Finally, metropolitan planning agencies traditionally have considered parking, not as a basic element of the transportation system, but as an ancillary service to be provided as travel demand requires. Hence, models of future travel demand (which include parking supply) are used to project parking needs for each sub-area of the region, but no consideration is given to the effect which alternative levels of parking supply may have on travel demand.

In summary, parking plans and programs traditionally have been:

- supply oriented
- fragmented in both planning and implementation

b) Recent Changes in the Treatment of Parking

Transportation planners recently have suggested that parking may play a basic role in the structure of the transportation system; that increased parking supply itself can be a stimulant to auto travel; that decreased parking supply can be a deterrent to auto travel; and that, because of these effects, parking supply can be "managed" to achieve certain transportation and land use goals, such as decreased auto travel for pollution control and energy conservation. Thus, they argue, management of parking supply should be an integral part of the metropolitan transportation planning process. This shift in emphasis recently has received impetus from two major federal programs--U.S. EPA regulations under the Clean Air Act of 1970, and U.S. DOT regulations for 3-C transportation planning in metropolitan areas, under the Federal Aid Highway Act, 23 USC 134.

i) EPA Parking Management Regulations

Under the Clean Air Act of 1970, EPA is required to set standards for ambient air quality and to designate air quality control regions (AQCR's -- usually corresponding to metropolitan areas) wherever there is now or will be a violation of the standards; the states are required to develop implementation plans (SIP's) for attaining those standards throughout the state by 1977 at the latest (the EPA administrator can substitute his own plan if the state fails to submit one or if the state submittal is inadequate); and EPA is required to promulgate guidelines for the development of SIP's. Among other things, the Air Act requires that "transportation and land use controls" be included, as necessary, in the implementation plans.

Subsequent court decisions have supported strongly the statutory requirement for transportation controls, so that EPA has been forced to provide guidelines for transportation control planning and to ensure that SIP's include the full range of transportation controls necessary for achieving the standards. Under the assumption that parking is:

- an integral part of the transportation system
- itself a generator of auto travel

EPA has included parking in its transportation control program.

EPA's approach to parking has two facets:

- inclusion of specific parking strategies in the SIP's

for certain AQCR's, specific parking control techniques have been used as transportation control measures. Examples are:

- CBD parking freeze

- early morning on-street parking ban
- airport parking freeze
- parking price surcharge (EPA's authority to require price surcharges was withdrawn by Congress)

- requirement for parking management plans

In addition to transportation controls per se, EPA also will require (the regulations were promulgated but currently are under suspension) a full parking management program in each AQCR which has transportation controls. The program must include a pre-construction permitting process for parking facilities, to regulate any negative air quality impacts, and a plan for the overall management of parking supply. The plan must represent a region-wide strategy for parking management, based on parking freezes, pricing policy or other measures, and careful consideration of the impacts of alternative local and regional parking controls; and it must demonstrate the degree of intergovernmental coordination necessary for implementation of the plan. If a region does not establish an acceptable parking management program, the state will be required to impose its own facility-by-facility review on the region. Failing that, the EPA administrator will conduct his own facility-by-facility review. (This is presumably an incentive for local action).

ii) Parking Management under U.S. D.O.T. Regulations

DOT's activities in the past have centered mainly on major capital investments--highways and transit--with very little consideration of low capital, short-range, management and operations-oriented transportation measures. But three recent trends signal a shift away from major investments:

- construction of the interstate highway system is nearly complete, so the range of potential major highway investments is narrower now than at any time in the past 20 years;
- many major transit and highway projects have encountered fierce citizen opposition, have failed to achieve predicted levels of performance and ridership, or have experienced astronomical cost overruns, so that the taxpayer's and increasingly the federal government's appetite for major capital investment is sharply diminished;
- Federal Laws applicable to transportation--the Federal-Aid Highway Act, the Urban Mass Transportation Act, etc.--recently have been amended to require that DOT ensure "efficient" use of existing transportation resources, both as a general agency goal and as a prerequisite to the funding of major capital investments.

DOT's reaction to this change in the transportation climate has been to revise its regulations governing metropolitan transportation planning and programming. The regulation, which previously required a "long-range plan" (typically oriented toward major investments) and several related documents, now requires a second element specifically oriented toward short-term, low capital options. This "Transportation Systems Management Element" (TSME) must address possible action in each of several different categories, in order to achieve more efficient use of the existing transportation system. Included in the categories are: shared ride programs (carpooling, etc.); traffic flow improvements; priority treatment for transit vehicles; and. . .parking management strategies. (There are several other categories not mentioned here).

Most of the parking management strategies recommended for the TSME by DOT are also recommended by EPA, e.g., reduced on-street parking to improve traffic flow, but the emphasis here is less on reduction of auto usage and more on encouraging efficient use of the automobile (e.g. parking incentives for carpoolers). More often than not, these goals are mutually supportive.

c) Summary

The parking related programs of EPA and DOT are based on an assumption that parking is not merely ancillary to transportation, but that in fact parking is an integral part of the transportation system.

Operating under this assumption, EPA and DOT have identified numerous aspects of parking policy which they feel can be instrumental in improving air quality and in achieving more efficient use of the transportation system.

And, through their regulations, they have established procedures at the regional level for management of parking policy, i.e., for the development of region-wide parking management "plans" which, in theory, will include a wide range of controls over parking in the metropolitan area.

Implicit in this policy is an assumption that parking can and should be planned at the regional level, yet there has been no careful study of the feasibility or desirability of this approach.

In an abstract sense, parking obviously can be planned at the regional level, but the real question is whether it can be planned efficiently and successfully at that level; whether a regional-level agency can obtain the necessary data, develop the requisite understanding of parking issues, and orchestrate the degree of intergovernmental coordination needed for successful implementation, in an arena traditionally dominated by local government.

To answer this question it is necessary first to look at the range of available controls over parking and to determine where they are planned and administered in the spectrum of local-regional-state-federal governments.

2. Methods of Controlling Parking

a) Local Control Mechanisms

Local governments traditionally have exerted a great deal of control over parking. Among their powers are:

- Zoning - A variety of parking control methods are available through zoning ordinances. These can be classified broadly into parking incentives, such as a height bonus for the provision of extra parking space, and parking disincentives, such as the classification of parking as a conditional use subject to case-by-case consideration by the Zoning Board.

- Building Codes - The building code also can be manipulated to encourage or discourage parking, as well as to exercise control over the design details of parking garages.

- Planning - The local planning agency frequently doubles as a development agency under certain urban renewal programs, often with a fair amount of autonomy from other local agencies and programs. Hence, the planning agency may control much of the new parking development in a city. A more subtle role of the planning agency is through its advisory capacity for the Zoning Commission, Board of Appeals, and City Council. Where this relationship is official or semi-official, the planning agency may have considerable success in promoting its own development-oriented goals.

- Traffic Controls - The local traffic department usually has considerable control over parking, especially over on-street parking. It determines the configuration of on-street parking, the rules governing use of on-street spaces, pricing policies, and signing for on-street parking (the latter two areas are much constrained by state laws and regulations). In some areas, the traffic department also employs meter-maids to enforce the parking rules, and in others, it doubles as a parking authority by operating municipally-owned parking garages.

- Police - The police issue parking tickets, otherwise enforce parking rules, and license (or operate) towing services for illegally parking cars.

- Taxes - In some cases, the city council or other local governing body can levy direct taxes on parking.

- Miscellaneous -

- municipal parking authorities - In some cities, much of the off-street parking supply is publicly owned and is operated by municipal parking authorities with significant control over parking policy.

- special purpose agencies - Certain agencies are empowered to control or coordinate parking policies for their own special purposes. The Boston Redevelopment Authority was one such agency when it had a broad urban renewal mandate; an air pollution control board might be another such agency if it were designated the lead agency for transportation control strategies affecting the city and given power to override the parking policies of other city agencies.

- parking policies for municipal workers - Cities are themselves employers with substantial amounts of controlled parking for people engaged in city business. Careful municipal regulation of total supply, of price, and of parking rules for its own spaces can be an important part of an overall parking management strategy and can set an excellent example for the private sector.

b) Regional and State

Regional and state agencies typically do not have broad powers to regulate parking, but in many cases they do control specific aspects of the parking system. Several examples are:

- Regional agencies which control some highways in a metropolitan area. The MDC in greater Boston is one such agency. It operates a system of parkways and major arterials, controls all parking on roadways under its jurisdiction, and further controls parking on certain other roadways where they intersect the MDC system.
- Airport parking, which may be operated by a metropolitan agency.
- Regional transit agencies with authority to site transit-related parking facilities, often with override power for local objections.
- State highway agencies which control sign and design standards for state-maintained highways and, in some cases, for local highways, too. Highway agencies often set standards to govern the use of roadways for parking (e.g., minimum space dimensions, allowable distances from intersections and hydrants, etc.).
- Federal installations. Wherever the federal government has a major installation, parking may be provided to its employees. The obvious and extreme example of this is Washington, D.C., where the federal government operates parking garages and lots all over the city, but most cities have federal buildings to house the expanding federal regional bureaucracy and have numerous other special purpose federal installations. Depending upon the scope of operation and the extent to

which the feds provide parking directly to their employees, the federal government may exert a great deal of control over parking policy in a metropolitan area (i.e., over the operating policy for its own parking lots).

- State installations.

c) Summary

This list of parking control mechanisms and other pressure points for parking policy is intended to provide some notion of the range of available parking controls and their distribution between levels of government and between agencies within each level of government. It obviously is not exhaustive--to compile a complete list would require an entire research effort, with detailed case studies of several metropolitan areas around the country.

Three things are clear from this list. First, there exists a wide range of government controls over parking, from direct operating authority over on- and off-street parking to indirect control through incentives over parking in new development. Second, parking control is extremely fragmented, especially between agencies at the local level. Third, most parking controls are local; i.e., policy is set and implementation is undertaken at the local level. The implications of these conclusions are discussed in the following section.

3. The Realities of Parking Management

Given the local orientation and fragmented nature of parking controls, there is some question about how easily regional parking management strategies of the types advocated by the federal government will translate into actual parking policy. For example, what would be necessary to organize and implement a "CBD parking freeze" advocated by a regional planning organization? Among other things, it would be necessary to:

- assemble sufficient information to provide for a full understanding of the current parking situation (number of spaces, distribution of spaces, operating policies, etc.) and a complete picture of the steps necessary for implementation (agencies responsible, applicable laws, etc.)

- obtain the cooperation of each city or town affected by the freeze.

- obtain the cooperation of each agency involved in the freeze.

Basic as they may seem, these goals are difficult to achieve. In metropolitan Boston, a CBD parking freeze was included as a transportation control element of the state implementation plan. The fate of this parking freeze illustrates some of the problems likely to be encountered by regional parking policies. EPA obtained public agreement from the elected officials of Boston to support the freeze, but did not examine the pre-freeze conditions in Boston and Cambridge in order to determine the effect of a freeze on the city, or in order to develop criteria for assessing the progress of the freezes. Cambridge took a hard look at the freeze and decided that since development--especially retail development--is the city's top priority, and the city currently has insufficient off-street parking, it could not implement a parking freeze at that time. Yet the city continues to pay lip service to the freeze while ignoring it at a substantive level. Boston viewed the freeze as a reinforcement of evolving municipal policy against downtown auto traffic. The mayor requested the Boston Redevelopment Authority to enforce the freeze and obtained the necessary changes to zoning rules (parking is now a conditional use subject to zoning board approval, etc). The BRA agreed to go along by freezing the number of parking spaces in the downtown area at the current level. But this has not meant a freeze on the development of new parking spaces. For each new development which includes parking, the BRA removes the same number of spaces from its pool of substandard, under-utilized lots, mostly on the fringe of the freeze area. Thus, effective parking capacity in Boston is not frozen. The BRA hints that support for the "freeze" is much less likely after the pool of substandard parking runs out, at which point the perceived need for parking as an incentive to development will come into direct conflict with the mayor's traffic reduction goals. To further complicate matters, Cambridge undoubtedly views Boston's unfrozen effective capacity as an added justification for ignoring the freeze, since a real freeze in Cambridge (which does not have a trading pool) would place the city at a disadvantage vis-a-vis Boston in attracting new development.

Experience with Boston's parking freeze illustrates the need for detailed information and full intergovernmental coordination in regional parking management. EPA's lack of information precluded a predetermination of the full potential of a parking freeze in metropolitan Boston and continues to prevent EPA from assessing the effectiveness of the strategy as it is implemented; EPA's superficial agreement with city officials (in lieu of a full analysis of the government actions necessary) ignored the opposition that one might naturally expect in any city government to what may be viewed as an anti-development program. These points, and experience gained through other parking management programs, may be generalized into a set of observations concerning the potential of and the limitations of parking management under existing institutional structures:

- control over parking is basically local - We have seen that, whether or not parking management strategies make sense at a regional level, the programs and regulatory mechanisms through which the strategies must be implemented are basically local. Localities control directly most of the on-street parking and much of the off-street parking through municipal authorities, and control indirectly the remaining off-street parking through zoning, building codes, etc. This locus of control over parking is not likely to change in the forseeable future, so the cooperation of and coordination with local governments are essential to any attempt at regional parking management.

- local incentives - The fact that control over parking is basically local does not mean that locals will never be interested in parking management. There are numerous incentives for them to embrace parking management strategies. For example: on-street parking limitations are favored by municipal traffic departments for safety reasons (street-side parking conflicts with through traffic), by fire and police departments because of the improved access they afford, and by city residents who often receive special permit parking rights (i.e., parking may be limited to city residents only); parking taxes are often favored because of the increased revenue; and limits on off-street parking are attractive to cities which cannot accomodate current traffic levels. Cities often are not aware of the boost parking management can give to civic goals, but many cities which are forced to review their parking policies for one reason or another emerge with an appreciation of what might be done through conscious management of parking. Earlier this year, the City of Los Angeles was requested to prepare a parking management plan under an EPA financed program. The mayor assigned a task force to this project, while expressing doubt about the workability of any parking management strategy. By June, the task force produced a report questioning the air quality potential of parking management, but listing a host of other potential benefits to the city and recommending a continuing and coordinated planning program for parking. Similarly, in Boston the EPA parking requirements triggered a complete review of the city's parking-related programs, revealing regulations of which the mayor's office had not been aware. The city hopes to adopt a coordinated approach to all of these regulations in the near future.

- fear of adverse impacts - Local hesitance about parking management is based principally on fear of adverse impacts. Most often cited is the fear that unilateral action by one city will reduce its competitiveness among the surrounding cities. Both Cambridge and Boston have expressed the fear that a freeze will make it even more difficult to compete with the suburbs for new development. On the west coast, San Francisco has much the same anti-auto viewpoint as Boston, yet will not adopt a parking freeze because of a stronger desire to maintain itself as the retail and business center of the Bay Area--it lately has been feeling extreme competition for business from Oakland and San Jose, the two other large cities in the Bay Area, and for retail trade from numerous suburban shopping centers.

Cities also fear internal effects of parking management strategies. San Francisco feels pressure from local interest groups every time parking management is suggested: the small businessmen claim that because their operations depend on rapid turnover of on-street parking, any restriction of on-street space would have an adverse effect; and construction lobbies argue that the decrease in development they see as the inevitable result of a parking freeze would cripple the construction industry (they often attribute outrageous dollar figures to the amount of lost construction). Such pressure is a powerful disincentive to parking management.

- local administrative problems - A second set of impediments to local parking management stems from administrative problems in local government. As we hinted earlier, local governments often do not know the full range of their parking-related powers. The few cities to take parking management seriously all have found it necessary to begin with a thorough review of municipal programs, and often have uncovered in the process municipal programs and regulations with significant, though previously unrecognized, effects on parking. (Parenthetically, these program reviews have raised municipal consciousness about parking management planning. A full enumeration of parking-related programs invariabley reveals implicit, and often conflicting, goals and objectives. Localities are then motivated to think about their real goals and examine how the parking programs must be altered to reflect them. The net result can be a locally developed parking management plan, based on political and administrative realities. At very least, this exercise forces local recognition of parking as an explicit policy arena in which local actions have significant and wide-ranging impacts.)

Unfortunately, most localities do not see the need for a clear understanding of parking programs, and, even when they do, time and monetary resources usually are unavailable.

Local resource constraints affect parking management in another way as well. Local government may not have the staff or the money to plan or to implement any parking strategy which is not cost-free or self-financing.

The most critical administrative problem concerns the fragmentation of authority within local government. Authority over local parking control is distributed among numerous agencies of city government. Some local agencies are staffed exclusively with mayoral appointees who serve at his discretion and thus are under his control completely. These agencies do not present an administrative problem for parking management, providing the mayor is willing to support such a program. But other local agencies which:

- consist of independently elected officials;
- consist of civil service employees; or
- consist of mayoral appointees whose replacement would be a sensitive political issue

do not respond necessarily to the mayor's wishes (in the short term; over the longer term he could make enough appointments in some cases to ensure proper representation of his views). These agencies may have their own goals--often in conflict with each other--and very little motivation to coordinate their programs. Thus, a unified local approach to parking management is unlikely without the presence of a strong executive and the evolution of a broad consensus within the city on what should be done about parking. This implies locally-developed plans, or, at least, plans developed with a tremendous amount of local input.

- information about parking - Without good information about the likely effects of parking management, it will be difficult to develop a local consensus or, in fact, to persuade locals to do anything at all about parking. Experience with parking management to date has shown that insufficient information is the critical factor working against local support. In Boston, in San Francisco, and in Phoenix, alarmist reaction to proposed parking measures could not be countered because information was not available about such things as the relationship between parking and development and the proportion of small business patrons using on-street parking. Without this kind of information, a reasonable discussion of opposing views cannot occur.

More fundamentally, it is not clear that parking management can achieve many of the goals claimed for it. Parking is, without question, a legitimate variable in many transportation and development problems, and should be planned carefully to regulate its impact in those two areas. But the effect of parking on air quality is not well established. It is assumed that parking has a secondary effect on air quality through its effects on travel and development; specifically, it is assumed that limitations on parking will hold down the demand for auto travel and thus help to improve air quality. Even if the presumed effect on auto travel is true (and that is by no means certain) is it not possible that increased cruising for parking spaces could offset any decline in auto travel and possibly worsen air pollution? That we cannot answer this question now is a good reason to proceed slowly with parking management until better information can be developed about the effects of various parking measures.

C. CASE STUDIES

Case studies in this section are based on interviews conducted in the summer and fall of 1975, except as otherwise noted. A list of personnel interviewed is included at the end of this section.

1. Boston and Cambridge, Massachusetts

a) Introduction

The first round of transportation control plans touched off a series of lawsuits, and in Boston, the South Terminal case decision upheld the EPA's right to impose such controls as long as they were justified by the data, but the court declined provisionally to accept EPA's data.[1] EPA was also prevented by an amendment to the Clean Air Act from imposing parking surcharges.[2] These events led to the development of a second transportation control plan for Boston, which was made public in February, 1975, and contained somewhat modified requirements for parking management. Since that time, EPA has indefinitely suspended its parking management regulations nationwide, pending Congressional determination of the proper role for EPA in parking management.

In spite of EPA's uncertain future in parking management, many cities are continuing to implement or plan parking programs. As will be seen in both the Boston and Cambridge examples, this is probably attributable to a recognition (at some levels) that there are benefits that can accrue to a city from a parking management program which are not directly motivated by a desire for clean air.

Institutional arrangements developed in response to EPA's initial requirements for parking management strategies are particularly interesting, since parking has typically had an ambiguous status in city government. Parking is generally the responsibility of a traffic and engineering department, or the police department, or both, and planning, if any, is typically concerned with providing sufficient capacity. Parking management, which implies an explicit policy to limit capacity, and in EPA's case to use scarcity and cost of parking as a disincentive to auto use, has often necessitated new institutional arrangements or modifications of old ones to provide the necessary legal powers and expertise to plan these programs. The precise arrangements made appear to have a fairly significant impact on the planning and enforcement that is actually accomplished, as illustrated by the Boston and Cambridge examples that follow.

Both Cambridge and Boston had given consideration to parking management prior to EPA intervention, and both modified their activities somewhat in response to EPA requirements. The approaches taken and the motives for early parking management differ significantly between the two cities, and will be explored in detail

b) Cambridge

In response to mounting difficulties in Cambridge with traffic circulation, and in reaction to the threat of the Inner Belt to divide

Cambridge into an MIT half and a Harvard half, the two universities formed a committee to address the city's traffic problems. The end product of the committee's efforts was a piece of legislation that passed the Massachusetts Legislature in 1961, establishing a Department of Traffic and Parking in the City of Cambridge. Very briefly, the legislation created the position of Director of Traffic and Parking, which is to be filled by a traffic engineer (member of the Institute of Traffic Engineers) who serves at the discretion of the City Manager. The Act also created a three member Board of Traffic and Parking, which may review any action of the Director upon receiving a petition signed by fifty registered voters. The Director may adopt, alter, or repeal regulations regarding the movement, stopping, standing, or parking of all vehicles in Cambridge (on city streets) except that he cannot control the trackless trolleys.[3]

In 1972, Cambridge initiated an experimental residential parking permit program in the Cambridgeport area, where residential parkers had long been in competition for spaces with area businessmen and those whose destination was Boston (people parking in Cambridge and taking subway downtown or walking to Boston University). Stickers were issued to residents of the affected streets, when they produced proof that they had an automobile registered in their name, and that their primary residence was within the permit area. The program was considered to be a success, and with modifications was made permanent, and plans were made to extend the residential permit system to other neighborhoods in the city. Under the first transportation control plan, the EPA required an on-street parking ban between 7 and 10 a.m. for Boston, but not for Cambridge; the City Council requested that Cambridge be included under the on-street ban, to avoid further problems of people parking in Cambridge and working in Boston.

Cambridge had no parking data at all when it first became involved in parking management under EPA, and unsuccessfully attempted to get EPA to fund a parking inventory. Now, as the residential permit program is expanded into each neighborhood, detailed parking inventories are developed.

Under the current (second) transportation control plan, Cambridge is continuing its residential permit program, instituting a 7 to 10 a.m. ban on on-street parking, and has had its total number of commercial off-street spaces frozen, so that the number of spaces cannot exceed those in existence as of October, 1973, with some exceptions, as discussed later.

The residential permit program continues under the administration and control of the Department of Traffic and Parking, and this office will also administer the on-street parking ban. While the freeze requirements are within the jurisdiction of the Department, the Director, George Teso, has shown less interest in that program than the others, and has made few plans for it.

The residential permit program, which pre-dated EPA, is seen as having positive benefits to residents (although admittedly at the expense of some businesses and employers)and has been considered a popular measure in Cambridge. The program has been modified somewhat from its original form. The early version of the program attempted to distinguish between residents of different areas of the city; for example, a person living near Fresh Pond (which had not been brought under the permit system) and driving to work and parking near the Courthouse (which was posted for residential parking only) was ticketed. This practice was successfully challenged in Commonwealth v. Henry P. Sorett, in which it was ruled that the action violated the equal protection clause of the 14th Amendment since it discriminated between residents of various areas of the city without showing a reasonable and rational basis for doing so. As a consequence, any resident of Cambridge may now park in any area of the city.

Visitor permits have been issued (two per household) in areas which are posted for residential parking. These permits are color coded for 13 areas of the city and may be used only within those areas. A limited number of additional permits have been issued to those with special needs--physicians whose practice is in Cambridge, for example.

The residential program has again become the subject of litigation; two lawyers who reside in other towns and work at the Courthouse (an area in which the permit system has been implemented and is being enforced) are arguing that the system restricts their right to work and travel (14th Amendment). This case is now before the Massachusetts Superior Court.

Cambridge has relatively little off-street parking, and the amount of commercial off-street parking, with the exception of some previously planned municipal parking facilities, is subject to the freeze. As a consequence, many employers have expressed concern about the impending morning parking ban on the streets, because they feel squeezed from both sides, the freeze and the ban. Viewed in this light, perhaps some of Teso's ambivalence toward the freeze can be understood. With transit improvements well in the future, and fringe parking in Cambridge still in the planning stage, as well as little off-street parking capacity to start with, such a freeze may well be premature. The on-street parking ban will have immediate positive aspects since it will facilitate the delivery of city services such as street cleaning and snow removal; this may also help to explain why this measure seems to be favored over the freeze. In recognition of the fact that there will be some who are substantially negatively impacted by the on-street ban, the Director is prepared to erect one hour meters in front of affected businesses, and will issue a limited number of permits to employers for distribution to employees who cannot find suitable alternatives to driving. Prior to granting these permits, Teso has said that he will review the measures that an employer has used to encourage employees to seek alternatives to auto commuting, and if he is convinced of a sincere effort on all parts, will issue permits which will allow parking on a specific street.

In addition to controlling matters which are strictly parking related, the Director of Traffic and Parking also has control over stopping of vehicles, which in practice means that the MBTA must receive approval for all bus stops from Teso. Perhaps as much as a function of personality as anything else, Teso appears to have considerable power in recommending routes to the MBTA, and thereby providing service to areas otherwise accessible only by automobile.

Teso's office has been considering other measures to make alternatives to driving in Cambridge more attractive. These efforts have centered around finding an appropriate lot for parking on the edges of Cambridge, and arrangements for MBTA or employer shuttle bus service to work.

Perhaps most importantly, Teso's office has control over enforcement of the parking program, in addition to making policy decisions. The Parking Control Officers work for the Director of Traffic and Parking in Cambridge, rather than the Police Department, giving Teso much better control over their activities.

Major problems with the program center around costs and revenues. Teso has been working on computerization of the residential permit system, a costly effort, and right now the dual system is very labor intensive. No new staff are expected to be added for the 7 to 10 a.m. ban--Teso observed that it was not fair to make the City add people--apparently distinguishing between this program imposed from the outside, and the residential permit program, a Cambridge program, for which staff were added.

The Department uses revenues from parking tickets to finance major construction projects, such as the Central Square parking facility, and can also use these revenues to defray their costs in general (although it appears that they also are budgeted for City funds like any other department). Teso is clearly frustrated by having to rely on the Court for recovery of fines, both because the system is inefficient (they are 2 to 4 years behind on summonses) and because clerks and judges void a substantial portion of the tickets which Teso's personnel issue. Teso appears to be concerned about both the loss of revenues and the fact that those in the courts appear not to share his sense of honesty in the matter of voiding tickets (Teso uses his privilege to do so very carefully, sending with each one a written explanation of the circumstances, and appears to wish that others could be forced to do the same). The ticket processing system is scheduled to be computerized by fall 1976, at which time if payment is not received within 30 days, a summons will be issued automatically. This may also give some control over the probelm of voiding.

In summary, the Director of Traffic and Parking is responsible for responding to EPA regulations affecting parking in Cambridge, interfacing Traffic and Parking operations with the MBTA, Metropolitan District Commission (MDC controls some roads in Cambridge, and intersections with those roads and Cambridge streets are of concern to both groups) and the Massachusetts Department of Public Works, which must approve all traffic control signs and systems. In addition, the Director of Traffic and Parking is responsible for both policy and enforcement. This centralization of power in one organization has advantages in terms of its ability to respond quickly to new problems, but it also seems to place a great deal of importance on the personality of the Director of Traffic and Parking.

Teso is definitely enthusiastic about the effects of the residential permit program, and will undoubtedly continue to expand and enforce the program. It seems likely that the 7 to 10 a.m. on-street ban will be implemented, at least on a trial basis, regardless of EPA's status, although it is hard to speculate more specifically on the outcome of that program because so many factors are involved. For example, if Boston implements such a ban, then Cambridge is extremely likely to, regardless of Federal regulations or lack thereof. The future of Cambridge's off-street parking freeze already looks questionable, and without EPA intervention, or concerted pressure on the City Manager, it does not seem likely that such a freeze will be implemented in the near future.

c) Boston

Control of parking supply was one of the early recommendations of the Boston Transportation Planning Review, which Governor Sargent endorsed, and included in a policy statement in the fall of 1972. As originally conceived, there was to be a freeze on the number of parking spaces in the Boston core area. A detailed study of parking availability and characteristics in the Boston area was undertaken by Wilbur Smith, Inc., which began in 1972, and is still used as the primary data base for parking policy. Early efforts to implement Sargent's policy consisted primarily of zoning changes applicable to the freeze area, which eliminated the height bonus which was given to developers if they provided extra off-street parking in their building, and made all parking a "conditional use," subject to approval of the Zoning Board.[4]

Other freeze efforts had not gotten very far when EPA promulgated its first Boston transportation control plan in 1973. Opinions of those currently working in the Boston Redevelopment Authority (BRA) and the Mayor's office indicate that the intervention of the EPA was seen as excellent for the City's freeze objectives since the "blame" could be shifted to the federal government, thereby removing developer pressure from the City to its federal scapegoat. Although the participation of the EPA has clearly caused some heartache for the City,[5] on balance the effect is seen as positive. The second transportation control plan for Boston, the one currently in effect, includes a freeze on commercial parking, a 7 to 10 a.m. on-street parking ban (modified in some areas to 7-9:30 because of prior signing efforts), and a residential permit program (to allow residents to be exempted from the on-street ban).

The fact that the freeze is limited to commercial parking, which is interpreted by EPA under the second TCP as parking for which consideration is paid, and which is open to the general public, has caused consternation among those concerned with parking in Boston. This definition apparently exempts free parking, parking open to patrons only and parking open to employees only. The free parking and the employee parking exemptions are the cause of most concern, free parking for the obvious reason that there is then no disincentive to parking whatsoever, which runs counter to the object of the freeze in the first place, and the employee parking because the commuter is precisely the one that the City feels should be discouraged from driving. The definition was developed by Region I EPA and included in the second TCP because under the first TCP people were defining "commercial" as it best suited their interest and it represents an attempt at clarification. Apparently no one from the city was consulted in the development of the definition, and there is no indication that it will be changed to cover free parking. BRA staff have observed that rising costs of construction may cause developers to construct buildings without parking capacity anyhow for purely economic reasons. A trend in this direction has already started in the South Station Area, where the Blue Cross/Blue Shield and Stone and Webster buildings have been constructed with no parking capacity of their own. It is expected that some portion of the South Station development parking capacity will be used by tenants of these buildings, but that space would presumably be commercial space and consequently subject to the freeze. Thus, the apparent exemption of employee parking from the freeze may be compensated for to an extent by the rising costs of providing parking spaces.

The freeze is being administered jointly by the Mayor's office, the BRA, and the Boston Air Pollution Control Commission (APCC). All three are currently involved in developing regulations for the freeze, which should be made public in December or January. It is anticipated that the APCC will be named as the lead agency, or the sign-off agency for the freeze, taking it away from the political arena of the Mayor's office, and away from potential conflict of interest problems stemming from the fact that the BRA is itself a developer in the urban renewal area. Specifically, the Governor will designate the City of Boston to implement the transportation control plan, and the Mayor will propose to the State that the APCC implement the transportation control plan for the City.

The APCC is currently a very small operation, and is headed by Steve Cohen, a lawyer by training. Their office has no capability to perform air quality measurements, and consequently, will evaluate the freeze's effectiveness on the basis of developing an acceptable process, rather than in terms of air quality goals. In a sense this can be interpreted as being closer to Sargent's original motivations for proposing the freeze. The APCC uses the BRA as its staff in many of the freeze matters, particularly with respect to the establishment and anticipated maintenance of a "freeze bank," a record of parking spaces in the freeze area, their type and location, and their availability, for the purpose of insuring that the total number of spaces does not exceed those in existence as of October, 1973. The Mayor's office plays a sort of overseer role in the process, trying to insure that all interests are represented, and dealing with outside groups that can have an impact on the success of the freeze, like the MBTA.

Freeze efforts are complicated in Boston by the variety of organizations that have control over parking. In addition to the Zoning Board which was mentioned previously, the Real Property Board may lease garages to private operators (but has no authority itself to operate them), the Commissioner of Traffic and Parking issues licenses which specify compliance with certain "house-keeping" measures such as signing and fencing, and a building permit must be obtained for any structure(or modification). In addition, the BRA serves as an advisor to the Zoning Commission and Board of Appeal.[6]

The on-street ban and the residential permit system are being administered by the Boston Department of Traffic and Parking. The responsibility for the residential program has been given by BT&P to the Little City Halls in some neighborhoods, since the bookkeeping involved is tremendous. Coordination of the on-street programs with the freeze is in its infancy, since initial meetings on the subject took place between BT&P and the three freeze groups, the BRA, the APCC, and the Mayor's office, in early December, 1975. The importance of personality becomes clear in this particular situation, since the Commissioner of Traffic and Parking has been characterized as "hostile" by representatives of the freeze groups. Apparently the Commissioner is concerned primarily with the fac. that signing for the two programs will be costly, and has expressed the opinion that if the EPA wants the job done, they can pay him to do it. This philosophy runs counter to that expressed by the Mayor's office and the BRA, who are eager to do everything within their power to get cars out of Boston.

It has been observed that the freeze alone will work to the advantage of commuters, since they typically arrive earlier than shoppers, and will get to the limited spaces first. In theory, this should be balanced by the 7 to 10 a.m. on-street ban, which will leave curb spaces available to shoppers and tourists. Getting sufficient cooperation from the Boston Traffic and Parking Department is therefore critical to the overall success of the Boston parking program, since shoppers and tourists are the very auto drivers that the City cannot afford to discourage too much.

Again in theory, there is a simple solution to getting cooperation from the Department of Traffic and Parking, since the Commissioner is a political appointee. A recent Boston Globe column by Ian Menzies observed that the Mayor was a poor administrator, and outlined a series of twelve points to improve the White administration, and the City. Point number twelve of the Twelve Point Program for the Mayor was: "He must confront the issue of his traffic commissioner, who persists in policies that will attract more automobiles to the city at the expense of increased use of mass transit and service improvements."[7]

A recent conversation with the Deputy Commissioner of Traffic and Parking revealed that the Deputy Commissioner is eager to get the on-street program under way, since he is convinced that the fewer cars there are in downtown Boston, the better off the City will be. There was an indication that this may become the Departmental viewpoint in the near future.

Even if the Boston Traffic and Parking Department undergoes a change of heart, it must engage the sympathies of others in order to get funding for their programs, since all of BT&P's funds come out of the General Fund. Ticket revenues go directly into the General Fund. Additional meter maids will be needed for both the on-street ban and the residential permit system. The Police Department must also be involved, since they are responsible for towing illegally parked vehicles; in addition, Police Department personnel issue parking tickets. There is no distinction between Police and meter maid (BT&P) jurisdiction or territory, it is simply a matter of who gets there first. Boston's court system is also behind in the matter of processing tickets, but the impact is not direct on the BT&P Department, since it receives its money through the General Fund.

The city is apparently taking a very restricted view of its responsibilities with regard to parking management, and fulfilling only the mandate from EPA. An exception to this noted by Cohen is that EPA policy is so narrow that it says nothing about the advisability of locating parking facilities in areas that are already local "hot spots." Boston intends to go beyond the EPA requirements in this instance, by adding a regulation that will prevent the location of a parking facility in such an area.

As a result of the freeze, Cohen expects pressure for more spaces to be designated for handicapped drivers, which the City will be able to do. It is also expected that mobility of the handicapped in general will increase with stricter parking measures, since there will be less auto traffic to compete with.

The issue of whether or not the program's potential benefits outweigh its potential disbenefits is not within the scope of EPA's mandate, and hence has not been addressed. Cohen refers to speculation and research on economic and other impacts of the program as a "luxury" which is not allowed for by federal funding.

With the exception of spaces for the handicapped, Boston appears to be taking a very hard line toward variances to the freeze, and in fact the BRA was at one point considering inserting the phrase "there will be no exceptions" in the freeze regulations. This approach differs significantly from the one anticipated by Cambridge for the on-street ban (in which meters will be erected and special permits issued for hardships) and currently practiced for the Cambridge residential permit program. For example, special permits have been issued for such groups as visiting nurses and Secret Service, allowing them to park in posted residential parking areas. At the freeze level, when the concern is for distributing a fixed number of parking spaces over all proposed developments, perhaps it is reasonable to expect that the policy can be strictly adhered to. It appears that there will be spaces to allocate to Boston developers in the near future, and perhaps by the time there are no more spaces, transit improvements will offset some of the negative impact. Most importantly, the freeze is concerned with allocating spaces to developments rather than to individuals. This appears to shift the responsibility to lot operators to devise a means of allocating spaces, and pressures on lot operators may well influence distribution of scarce spaces.

Boston has also taken a different stand from Cambridge on the matter of exceptions to parking by non-residents in residential permit areas. According to the Deputy Commissioner of Traffic and Parking in

Boston, anyone may park in a residential permit area for a period of 2 hours or less, a policy which should make granting exceptions unnecessary. It appears that this policy may solve some problems of administration while creating others. Aside from the fact that there are undoubtedly some groups which legitimately need more than 2 hours to fulfill their responsibilities, the 2 hour criterion seems to make enforcement much more difficult, and Boston is already short on enforcement personnel.

It is difficult to assess the extent to which Boston's program will be effective, since it is still in the developmental phase. The fact that parking controls have been under development for nearly three years may in itself be a sufficient indicator. Without the EPA's backing on the freeze, the Mayor's office has speculated that it will be possible to implement, but Boston will be forced to make more compromises than would be expected under Federal backing. An additional aspect of the freeze that came out of one interview is a claim that Boston now has sufficient off-street parking spaces to serve major anticipated developments for the next twenty years by phasing out obsolete City mechanical garages and other underutilized facilities and allocating these spaces against such developments as Park Plaza, South Station, and other urban renewal area projects. If this claim is true, it seems that the effective parking capacity of the City will continue to increase, as spaces are made more convenient by new developments.

The future of the on-street measures seems linked to the future of Boston Traffic and Parking Department, which at this time is somewhat unclear. Both the residential permit program and the 7 to 10 a.m. on-street ban will require diligent enforcement in order to be effective, and enforcement is contingent on additional money from the General Fund for personnel, and on cooperation from the Police Department for towing.

Effectiveness of the freeze will also depend on effectiveness of the on-street programs, as was mentioned earlier, so Boston is faced with major coordination efforts in getting their parking management program operational.

d) Comments

Parking has typically not been an issue of major concern to cities, but recent EPA regulations which tried to force the use of parking disincentives raised a great deal of controversy over the role of parking in a metropolitan transportation system. Although the debate over whether or not parking strategies will actually reduce VMT is far from being settled, a number of cities are continuing to develop parking management strategies to serve other motives or goals.

Those departments or agencies which were initially delegated to implement parking measures under the EPA reuglations seem to have had considerable influence in determining the outcome or rate of progress on the plans. Each group or department in a city government seems to have a slightly different view of the world, and this view seems to influence the department's assessment of the utility of various strategies, as well as the best way to go about solving the problem. While this situation is quite reasonable and understandable, it seems that watching a new set of requirements being met, as in this parking example, serves to graphically illustrate the importance of political climate, personality, and institutional structure on the outcome of planning in urban transportation.

It appears that those groups or departments which feel that they can gain something tangible in terms of their overall goals from implementation of the measures will implement them; other departments will wait until they are forced. The BRA-Mayor's office alliance in Boston favors getting cars out of Boston as a planning goal, and the EPA regulations presented a politically viable excuse for getting the program moving. A person who views himself primarily as a facilitator, such as the Director of Traffic and Parking in Cambridge, can see advantages in delivery of city services from the on-street measures, but would be less convinced of advantages to be gained from the off-street freeze, and Teso seems to be conducting his program accordingly. The present Commissioner of Traffic and Parking in Boston is apparently not sympathetic to the overall goal of less auto traffic in Boston, and has also chosen not to place much value on the benefits to traffic circulation and congestion that might result from the parking programs; his stance has been that he will have to be forced to cooperate. It seems that a department's interpretation of self interest in assessing a program such as parking management can materially affect the way in which a program is planned and administered.

These observations have numerous implications for a federal agency like the EPA which is making demands on local level organizations for planning and implementation of programs. First of all, understanding the institutional arrangements and personal inclinations of the major actors in each city seems critical. Without substantial funds to distribute to people like the Commissioner of Traffic and Parking in Boston, to entice him into compliance, or without meaningful threats and a reputation for backing them up, and outside agency like the EPA has no practical recourse except to play sophisticated power games. In other words, a program should be "sold" on its merits to those involved, with the "sales pitch" appropriately worded in each case to reflect departmental and political interests. The differences observed between Boston and Cambridge also reinforce the claims that solutions to parking management should be unique to each local area, since measures suitable for one situation may not be applicable to another situation. The parking freeze, for example, seems suitable for Boston, but may be overly restrictive for Cambridge.

A final observation on the effectiveness of EPA intervention in the local planning process centers around the fact that those programs which show the most promise in each city--the residential permit program in

Cambridge, and the off-street parking freeze in Boston--are precisely the programs which were under way prior to EPA intervention. This seems to indicate a need on the part of EPA personnel to carefully examine the process that they are trying to influence, in order to discover points of advantage and mutual interest.

2. Los Angeles, California Area

The Southern California Association of Governments (SCAG) is the 3C agency for the Los Angeles area, which is physically huge (38,528 square miles; making SCAG the largest 3C agency in the country) and extremely diverse, both environmentally and socially. There are 6 counties represented in SCAG, and of the 151 cities in the region, 125 are members of SCAG.[8]

Originally EPA Regionl IX expected that SCAG would develop a regional parking management plan for the entire area. SCAG staff explored the idea, and realized that because of the huge area and the great diversity in local parking policies, as well as the fact that there was no regional transit to speak of to tie the area together, SCAG simply could not produce a regional parking management plan. Instead, SCAG has used a $250,000 grant from EPA via UMTA to fund 4 demonstration programs at the local level, and to fund SCAG for the development of regional parking management guidelines. SCAG cites three reasons for its decision to follow the guidelines course of action: "1) SCAG is a voluntary organization and has no legislative authority to implement or enforce plans, 2) the region is so diverse that no single program could meet the needs of all the local jurisdictions, and 3) no mechanism existed for allocating or reallocating the region's staggering number of parking spaces."[9]

In addition to the reasons cited above for SCAG's reliance on local level participation in parking management planning is a fourth reason which undermines, to an extent, the validity of a regional approach. SCAG studies (based on a CALTRANS model) indicate that parking strategies alone will have very little effect on areawide VMT and photochemical oxidant concentrations; coupled with other programs such as improved transit, a decrease in VMT might be possible. Therefore, SCAG sees the primary usefulness of parking management as local measures to improve circulation, to minimize CO hot spots, etc.

The guidelines approach seems to face the realities of parking management as far as local control that were addressed in our earlier discussion, but still relies on voluntary compliance of individual cities.

The four cities which have been given funds to explore the potential of parking management are:

Los Angeles - large city	$100,000
Long Beach - medium city	20,000
Brea - small city	10,000
San Bernardino - county-wide prog.	30,000

(The remaining $90,000 has been allocated to SCAG for development of guidelines). The program has been under way for a year, and draft reports have been received from Long Beach, Brea, and San Bernardino. Los Angeles' proposal was approved last July, and since then they have been fooling around with their work program, and trying to put their staff together; they are funded for a 1 year study from the time the effort gets under way, which it has not done yet.

Long Beach and Brea have developed plans which are basically parking-transportation management plans, and both cities are expected to implement their plans, regardless of EPA's future involvement in parking management. Brea is planning to revamp all of its zoning ordinances and will make appropriate recommendations to support their parking measures to meet a variety of civic goals. Long Beach has plans for a downtown redevelopment program, and sees parking management as an integral part of the program.

San Bernardino went well beyond the limited objectives of the study and in addition to parking essentially brought in all of air quality by including such things as VMT minimization measures. San Bernardino is located approximately 60 miles east of "downtown" Los Angeles, and at the time of the last census, was ranked fifth in the nation in terms of its dependence on automobiles.[10] Because of the meteorological patterns in the Los Angeles Basin, many feel that the potential for air quality improvement in San Bernardino through VMT reduction measures is limited because the bulk of the pollution is generated elsewhere. On the other hand, San Bernardino is not really in a position to criticize other cities for their lack of action unless they make an effort themselves. In any case, San Bernardino is the only demonstration project so far to have adopted its plan. However, the San Bernardino Board of Supervisors is holding up implementation of the entire plan because it is a downwind county, and it does not want to put itself at a competitive disadvantage with the upwind counties which have not adopted parking management plans. Les Spahnn of SCAG feels that the chances for obtaining leverage over the remaining counties in the area are directly tied to proposed Clean Air Act amendments. If a regional approach to air quality is included in the Clean Air amendments with 208 (FWPCA)-type legislation, then Spahnn feels that there may be hope for getting the necessary regional-level control to solve this sort of problem. Without this type of control, there appears to be very little chance that San Bernardino's plan will be implemented.

Incidentally, there is currently no 208 designation in the Los Angeles area. SCAG has been fighting to get designated, but no decision has been made to date.

3. San Francisco, California Area

The Metropolitan Transportation Commission (MTC) received $150,000 from EPA via UMTA, and is funding San Francisco, San Jose and Oakland to explore the potential of parking management. The remainder of the region is being covered by Alan M. Voorhees Associates, which eventually selected five prototypical (their term) cities for analysis: San Leandro, Walnut Creek, Cupertino, Petaluma, and Vallejo.

Analyses are to cover development of parking strategies and a scheme for evaluating the effectiveness of the strategies. In addition, in the Voorhees study, a measure of political acceptability of each strategy was determined, using the Delphi technique.

The cities involved have apparently completed their data acquisition and are now in the process of working toward a draft report. It is not expected that any real planning will be done under this contract, since lack of EPA regulations removes the real driving force behind parking management planning. MTC has been characterized by those in EPA Region IX as having failed to take a leading role in parking management even before the suspension of EPA regulations, and having been pushed to take every step that they did take. John Warren of MTC feels that the issue of whether or not parking management is effective in meeting its air quality objectives is an important one which has not been satisfactorily addressed. The contract that MTC had was not sufficient to allow them to explore the problem.

Parking planning has proceeded far enough in the Bay Area for a number of problems to have surfaced. According to MTC one of the major problems is that cities do not have the authority to control the operation of privately owned parking facilities (California courts have not interpreted regulation of private parking facilities as part of the city's police powers).[11] Taken at face value this does indeed seem to preclude efficient parking management; however, the fact that San

Bernardino, Long Beach, Brea, and San Diego have developed parking management plans would indicate that the problem is not as large as it initially appears. First of all, it seems that MTC's reference must be directed only at control over rates or rate structures of private facilities, since cities clearly have other kinds of control over all types of parking. As mentioned in our previous discussion, existing parking can be taxed by cities, and zoning ordinznces, through "conditional use" and other categories, can require periodic justification of a facility's existence, and therefore provide a basis for phasing out existing facilities. Those cities which have been studied which have parking programs under way, Boston and Cambridge, do not rely on control of parking facility rates as a major control strategy. In fact, the only control concerning rates known to us is that the BRA will be able to specify rate structures (for example to favor short term parking) for parking facilities within the urban renewal area in Boston. It is not possible to tell whether MTC is using this rate control problem as an excuse for inaction, or whether they are genuinely unaware that parking management can be achieved in any way other than through control of parking rates.

Other problems that MTC has cited are lack of regional authority over parking matters (which has been discussed previously), leading MTC to encourage individual cities to proceed on their own. This of course has led to a San Bernardino-like situation, in which some cities have indicated a willingness to do parking management, but only if they can get assurances that adjacent cities will also manage their parking. Another problem cited by MTC is that much of the area currently has excess parking capacity, although this is not true quite so much for San Francisco.

D. CONCLUSIONS AND RECOMMENDATIONS

Based on the preceeding discussion and on the case studies, we can formulate a number of conclusions and recommendations about parking management:

1. Parking Management and Planning Should be Viewed as Transportation Planning.

No analysis which has been made known to us has been able to demonstrate that parking management alone is an effective VMT reduction measure. This single factor seems to have contributed significantly to the lack of seriousness with which parking management has been treated in some areas. On the other hand, most people seem willing to agree that in cooperation with other transportation measures, parking management may be effective. This situation would seem to imply that parking management (or parking measures) should be included as part of the TCP, and not as a separate entity which needs additional justification. Parking measures have been included in some TCPs, included in the indirect source requirements, and also included in the parking management plans. Inclusion of all parking measures in the TCP will eliminate unnecessary duplication, and will group parking with the other transportation measures where it most reasonably belongs.

It is recommended that in areas where it is appropriate, the TCP should specify that parking should be managed or that a parking management plan be developed and implemented, rather than specify the measures to be implemented. The requirement for a plan should result in a more satisfactory end product because it will enable local development of the plan, and thus will more accurately reflect local interests in parking and have a greater probability of being carefully enforced.

The requirement for parking management in the TCP should be worded in such a way as to parallel the requirement for consideration of parking management in the joint FHWA-UMTA Transportation System Management Element. In this way the EPA and FHWA-UMTA programs will clearly be mutually supportive in action, regardless of the motivation for actually performing the parking management. This will have the additional advantage of making parking management eligible for funding under UMTA sections 3 and 5 and for Federal-aid highway funds.

Inclusion of parking management as an element of an area's ongoing transportation planning efforts as the above paragraph suggests will have the effect of focusing attention on parking as a single element of the overall transportation system. In this way parking controls may be seen as fitting in with and supporting an area's transportation and land use goals. Parking management is difficult to justify when it is set apart from other transportation elements by separate regulations requiring separate plans, particularly in view of its questionable impact on VMT. However, it is relatively easy to argue that the transportation system as a whole can be managed to produce VMT reductions; since parking management is one element of that system it should also be managed.

2. Parking Management Plans Should Be Developed at the Local Level, with Regional Controls.

As the previous discussion has indicated, it is unrealistic to expect a regional transportation planning agency to produce a workable parking management plan, because:

i) parking controls almost exclusively are local;

ii) a regional agency would have difficulty in assembling sufficient information to make a good plan, especially in understanding subtle details of local institutional structure;

iii) a consensus must be developed among opposing groups in each city (as well as between cities). This is hard to do on a regional level, since it would require an enormous staff to keep abreast of all the issues.

In addition to the fact that under current legal structure, most parking controls are local, most of the benefits of parking management are also expected to be experienced at the local level. However, because of the disincentive nature of parking controls, regional participation seems necessary in some cases in order to insure that benefits from local parking management can be realized. The case studies clearly indicate, for example, that separately developed local plans are acceptable to the town developing them only if adjacent towns or counties do the same, so that the area managing its parking does not place itself at a relative disadvantage. (The issue of potential loss of retail sales due to parking management is one that has yet to be satisfactorily explored; since there is little information on the subject, loss of retail sales is generally used as an argument against parking management.) It seems clear that in some areas, local governments will need a concrete means of influencing one another to implement parking plans, and the most reasonable (or at least readily available) forum is through the regional agency. Other areas in which only a few cities are involved and have compatible goals, such as Boston and Cambridge, may not find it necessary to work through the regional agency. Regional agencies in different areas would have different levels of involvement in parking management, depending on the ability of local governments to reach the necessary agreements to enable each city to implement its parking management plan.

The Los Angeles example indicates that providing guidelines for plan development and a forum for discussion may, in some cases, not provide sufficient incentive to get all local governments in a diverse area to implement parking management plans. In such cases, the regional agency should be empowered to seek compliance through:

- conditioning planning grants on conformance with regional guidelines or goals
- conditioning the approval of other transportation projects on conformance with regional guidelines or goals (e.g. the regional agency

might refuse to recommend projects desired by localities not in compliance with regional goals or guidelines).

It should be emphasized that regional goals or guidelines should not necessarily be rigid, detailed documents. Guidelines might, for example, contain a listing of parking strategies and recommend that they be used, but if not used state why not. In such a case a reasonable negative response might be: "City A will not implement an off-street parking freeze since it has only 2000 off street spaces, and the real parking problem in the city is on-street parking." While guidelines might describe a procedure for local governments to follow in the development of a parking plan, it should be recognized that parking controls are primarily in the developmental stage, and such steps as inventories, while useful, are costly and are less needed than some experience with implementing various parking measures. Areas proposing to implement a parking tax, for example, should be encouraged to pick a tax rate and try it for a certain amount of time, and adjust it periodically to achieve the desired effect, rather than perform inventories and try to figure out elasticities for parking and estimate the tax level based on those calculations. Disincentives of this type are not well understood, and it seems desirable to get some parking programs under way - voluntarily or with varying degrees of pressure from regional agencies - in order to determine their impacts, thereby settling many of the lack of information issues raised elsewhere in in this discussion.

3. EPA Should Promote Local Interests in Parking Management, Regardless of Local Motives.

Although parking management is primarily a disincentive measure, it has received support at the local and regional level. Parking management has or is being proposed as a means for meeting diverse local goals including: improving local traffic circulation, decreasing the number of vehicles downtown in conjunction with urban renewal projects, facilitating the delivery of municipal services such as snow removal and garbage pickup, reserving streets in residential areas for parking by residents only, and increasing the city's tax revenues. However, it is not reasonable to expect total agreement from all parts of a city government on the desirability of parking management, or on the correct parking measures to use if there is substantial agreement. While these decisions are largely political, a federal agency like the EPA can participate in the political process to its advantage by identifying and lending support to those in city governments in favor of parking management, regardless of the city's motive for parking management. For example, advice might be sought from those supporting or already developing parking measures if definitions are developed or regulations changed. Establishing this type of communication should work to the advantage of the EPA, since it will reveal political peculiarities of the area explaining why some approaches are more reasonable than others, and it should work to the advantage of the groups within the city to have federal support behind their programs. In addition, this communication should be helpful when EPA makes critical definitions or changes in regulations, so that a city's efforts will not be inadvertently underminded by a change in emphasis by EPA.

Parking management has proved to be controversial in many areas, due in part to the fact that it is a disincentive measure, and also in part to the blast of negative publicity surrounding the early parking schemes (like color coded stickers for each car, and substantial federally-imposed surcharges). On the other hand, there is support for parking measures in many cities, which could benefit from sensitive federal involvement to help promote their programs. It is recommended that EPA develop an understanding of the local political climate and seek opportunities to promote federal objectives through local political channels.

4. EPA Should Fund A Parking Management Demonstration Program

A factor that will continue to plague parking management for some years is the huge number of unresolved issues which are associated with the impacts of parking controls. In order to put these questions to rest, and to generate good will and various other desirable side effects, EPA should fund a demonstration program.

Although some cities like Cambridge have parking programs fairly well under way, they may never provide the type of information that reluctant cities seek. In Cambridge, for example, there is only one air quality monitoring station (Science Museum), located in a remote corner of the city at the intersection of numerous superhighways. It is improbable that parking measures implemented in Cambridge will have any impact on readings at that site, and most importantly, that site is not representative of the areas in which most people in Cambridge reside. If an improvement in air quality can be demonstrated to be attributable to all TCP measures together (the approach mentioned under #1) or to parking management alone, then EPA will be in a greatly improved position. Demonstrating to city residents that these measures are effective may be an immense step forward in getting local cooperation for parking management planning, but will probably require special monitoring and evaluation efforts.

In addition to the air quality issues, a demonstration program could be devised to monitor social and economic impacts of parking management, if that proves unfeasible, then of TCP measures as a group. Prior to suspension of the parking management regulations, EPA placed itself in the position of demanding that parking management programs be developed separately from TCP's with very little information about the VMT impacts, social and economic effects and other implications of parking management. Since EPA is forced to rely on local governments to develop and implement these programs, and EPA has no direct controls over local government, it is recommended that EPA make every effort to gain the sympathy of local governments by attempting to develop more information on the effects of parking controls. Even if local governments are forced to develop parking plans, they cannot be made to enforce them effectively. EPA's best approach to getting parking managed at the local level appears to involve showing that it works and can have beneficial impacts, and then carefully lending support to those in local governments who favor parking controls. The best way to show that parking works would seem to be through a well designed demonstration program.

5. Some Requirements in Parking Management Plans Should be Relaxed

The enumeration of minimum information to be contained in parking management plans dated August 22, 1974 appears to be inadequate in two main aspects 1) the fact that it apparently refers only to management of parking in parking facilities (elsewhere defined as an area used to park 250 or more vehicles) and 2) it is not clear that some of the information required is necessary for effective parking management.

Regarding the first point, it seems only reasonable that on street parking controls be included under parking management, so that the entire parking portion of the area's transportation system can be dealt with at once. This can be accomplished with no overlapping of programs if all parking considerations are included in the TCP, as recommended previously.

Second, an inventory of average daily vehicle miles traveled, and information concerning the VMT reduction to be achieved through the plan seem to be meaningless bureaucratic exercises which are totally unrelated to the potential impacts of the plan. VMT inventories are not inventories, they are estimates, and as such may contain substantial inaccuracies. Information concerning VMT reduction to be achieved through the plan must necessarily be fictional, since so many assumptions must be made about changes in the rest of the transportation/land use system that changes in traveler behavior attributable to this single policy cannot be reliably determined.

Inventories of existing parking facilities can be expected to be constructive only if limited to type, location and capacity for off-street facilities and for on street capacity, to contain an estimate of the amounts of legal and illegal curb space. Requirements for extensive inventories including occupancy rates, and use by category (eg. business, work, shopping, etc.) tend to be very costly, and are not always useful. The important point with regard to much of this information is that it requires relative sophistication-- parking controls do not. Parking controls are still in the "shooting in the dark" stage because of the huge amount of local variation that can be expected and because there has been very little actual experience with parking management. Local areas interested in parking management should be encouraged to consciously plan for parking as one more element of their transportation system; they should not be overwhelmed by large data requirements. As has been argued elsewhere in the recommendations, it seems that the most reasonable solution to parking management problems is to work with people and get them doing it.

If the parking management plan is developed in the context of the area's transportation plan, then it will automatically include community participation, development of alternatives, discussion of impacts, etc. The most important unique elements of the parking management plan seem to be details of implementation and enforcement, and mechanisms for communicating with all of the groups in an area that can impact the effectiveness of parking management, including transit operators, police department, traffic and parking department, etc.

It seems that a more relaxed approach in parking management is desirable since present information requirements are largely artificial--it is difficult to know what is really necessary until parking controls have been applied in a few more areas. Cambridge was able to proceed on its parking plans and develop its detailed inventories simultaneously; it seems that individual approaches such as this should be encouraged to get parking into transportation system planning. More sophisticated approaches and requirements can then be developed as parking controls are better understood.

FOOTNOTES

1. South Terminal Corporation, 6 ERC 2025, 1974.

2. Clean Air Act, 42 U.S.C. 1857 et seq.

3. Chapter 455 of the Acts of 1971, An Act Establishing a Department of Traffic and Parking in the City of Cambridge, reproduced in "Program and Financial Requirements for Enforcement of Clean Air Transportation Control Plan", Report by City of Cambridge, Mass. to U.S. Envrionemntal Protection Agency, June 28, 1974.

4. An Access Oriented Parking Strategy for the Boston Metropolitan Area, Final Report, prepared by Wilbur Smith, Inc. for the Massachusetts Department of Public Works, in cooperation with USDOT and FHWA, July, 1974.

5. An example which was cited by many participants in the freeze is referred to as the Rouse case. In order to secure financial backing from banks, developers are often required to produce proof that all necessary permits and licenses have been obtained. In this case a developer of an urban renewal parcel which included parking spaces requested from the BRA clarification on the status of the freeze (this was between TCPs) in order to comply with such a request from his bank. To make a long story short, BRA tried repeatedly to get such an answer out of the EPA, then tried for any response at all (they requested a letter saying that EPA had received their letter), and finally settled for the best that EPA would come up with-- a photocopy of BRA's original letter with a "received" stamp on it. While the EPA may actually not have known the status of the freeze, since it was a subject of litigation, even a response to that effect would have helped influence future intergovernmental relations.

6. Wilbur Smith, Appendix B, Legal Context for Parking Management, July, 1974.

7. "12 Point Program for Mayor", Boston Globe, column by Ian Menzies, December 3, 1975.

8. "The Development and Implementation of Parking Management Programs in California's South Coast Air Basin: A Transportation and Air Quality Improvement Effort", Nancy L. Chinlund, Robert A. Doty, Leslie S. Spahnn, presented at The Workshop on Parking Management Regulations of the Environmental Protection Agency, May 1, 1975.

9. *Ibid*.

10. Interview with George Visbal, Caltrans, San Bernardino 8/12/75.

11. "San Francisco Bay Area Regional Parking Management Plan Guidelines", Summary of Results, Alan M. Voorhees and Associates, Inc., December 3, 1975.

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VI. CLEAN AIR ACT AMENDMENTS

A. BACKGROUND

Several amendments to the Clean Air Act of 1970 were proposed during 1975. One part of the M.I.T. research effort was to review and critique the transportation-related portions of the proposed legislation and to suggest modifications or alternatives. M.I.T. prepared detailed commentaries on the relevant sections of several draft amendments; met with E.P.A. personnel to discuss how transportation controls should be treated in the Clean Air Act; participated in a briefing of the staff of the Subcommittee on Environmental Pollution of the U.S. Senate Public Works Committee; and prepared proposed wording and support material for use by E.P.A.[1]

The proposed changes to the Clean Air Act include:

- an extension of the deadline for attainment of the air quality standards;
- governor designation of "areawide" (regional) air quality planning organizations;
- required development of air quality management plans (A.Q.M.P.s), specifically including transportation control strategies, for each region with serious air quality problems; and
- sanctions for failure to produce and agree to implement an acceptable A.Q.M.P., in particular, cutoffs of certain federal funds.

Because the specifics of the proposed amendments have changed considerably from draft to draft, it is inappropriate to discuss these details in this report. Instead, the discussion focuses on the four topics listed above and on the major addition proposed by M.I.T., a requirement for guidelines on the air quality management planning process.

B. EXTENSION OF THE DEADLINES

The Clean Air Act currently requires attainment of air quality standards by 1977 at the latest.[2] By current estimates, however, at least 15 cities will be unable to meet the standards for those pollutants caused primarily by the automobile--unless they resort to drastic measures to curtail auto use (e.g., gasoline rationing, limitations on gasoline sales, periodic bans on driving). Because there is general agreement that such drastic measures should not be put into effect, extensions of the deadline for meeting the standards have been proposed, the suggested extensions take several forms:

- a simple postponement in the attainment year (alternative dates have been proposed);
- extensions of the deadline for those areas unable to meet the current date with regard to particular pollutants, the length of the extension to be determined on a case by case basis; sometimes with a cut-off date for all areas;
- extensions for particular areas as above, with required demonstration of progress in moving toward full compliance with the standards; sometimes with a cut-off date.

Although there is clear need for extension of the deadline, simply moving the attainment date back is unlikely to cure the problems now being encountered. For one thing, some areas (most notably Los Angeles) would find it difficult or impossible ever to attain the standards by any of the deadlines seriously being discussed. The single deadline would provide more time than needed for some areas, and not enough time for others. Therefore, we prefer setting deadlines for attainment in those areas missing the 1977 date on a case-by-case basis.

More to the point, however, a major problem has been that areas have slow to get started on implementing measures for air quality. Without some requirement that the areas show progress, any extension of the deadlines could just mean more delay. It is our recommendation that annual showing of reasonable progress in implementing measures to improve air quality be required as a condition for further extensions. Reasonable progress could mean, for example, completion of studies on implementation or partial implementation of particular strategies, creation of necessary legislation and regulations to implement control programs, hiring of additional police officers for enforcement, and so on. Each area could be required to submit a brief proposal of activities over the next year, and EPA could impose conditions. Failure to show reasonable progress, unless justified, would lead to imposition of sanctions. In this way, EPA could assure steady movement toward compliance.

Regardless of the conditions imposed on attainment, it will not be possible to assure compliance unless effective sanctions are available to EPA. Sanctions are discussed in E., below.

C. DESIGNATION OF REGIONAL AIR QUALITY PLANNING ORGANIZATIONS

Proposed amendments require the governor of each state to designate an air quality planning agency in each region with serious air quality problems. This agency would take responsibility for the development and implementation of all air quality strategies not retained at the state level.

This is a positive development for transportation control planning, since transportation in metropolitan areas traditionally has been planned at the metropolitan level. In fact, transportation plans and projects generally must be approved by the Metropolitan Planning Organization in order to be eligible for federal funds. Thus, placing responsibility for most transportation control measures at the regional level provides a remarkable opportunity to eliminate many of the interagency coordination problems that have arisen under the current Act.

However, several drafts of the amendments have required that the agency designated for 208 water quality planning, where it exists, also be designated as the air quality planning agency. This stipulation apparently is the result of a desire to concentrate federal programs for environmental protection in one agency, and so stem proliferation of federally mandated regional planning bodies, which has come under increasing criticism in recent years. In some cases, the 208 agency and the MPO are the same; in others, however, they are not. We feel strongly that, whenever possible, the regional agency planning for transportation controls should be the designated metropolitan transportation planning organization. Otherwise, parallel transportation planning processes will exist at the metropolitan level, with wasteful duplication and potentially disastrous results. Designation of the MPO also would serve the federal goal of utilizing existing agencies in new programs. We therefore recommend that the governor be given latitude in assigning responsibility for air quality planning to the agency or agencies with requisite capabilities. It is strongly urged that the designated agency for Transportation Control planning be the M.P.O. We see no reason why an additional agency could not be given responsibility for any non-transportation related (i.e., stationary source) air quality planning which is not retained at the state level.

It is also recommended that the EPA Administrator be given the power to approve or disapprove agency designations. Approval should be granted upon a showing that each designated agency has or will have within a reasonable time all of the capabilities necessary for successfully carrying out the planning responsibilities assigned it. This would give EPA limited control over agency designation but would enable the Administrator to reject an agency clearly unqualified to carry out its assigned responsibilities.

D. DEVELOPMENT OF AIR QUALITY MANAGEMENT PLANS

Proposed amendments would require the development of an air quality management plan (AQMP) for each area having serious air quality problems. The major difficulty with the proposals as written is that they do not specify clearly the relationships between the proposed AQMP and existing planning documents such as the state implementation plan, the transportation control plan, and the air quality maintenance plan.

It is crucial that duplication of planning activities be avoided. Therefore, we recommend that the proposed legislation be clarified and interpreted as follows:

- Governor designations of regional agencies should have the effect of transferring responsibility for the appropriate portions of SIPs, including TCPs, to the regional agency.
- Thereafter, the designated agencies would have full responsibility for plan revision and updates, and implementation.
- The regional agencies also would have responsibility for any air quality maintenance programs related to their assigned responsibilities.
- The state would retain full responsibility for all portions of the state implementation plan not transferred to the regions, including any maintenance programs related to the retained portions.

Thus, for example, the state could assign an MPO responsibility for all portions of the TCP except for inspection and maintenance programs. Thereafter, the MPO would be responsible for implementing and revising the TCP as appropriate, and for all further studies on transportation controls. The state, however, would have responsibility for any further I and M planning, for implementation, and for any related maintenance programs. In this example, the state also would retain responsibility for stationary source control. The air quality management plan for each region would then be the relevant portion of the state's plans plus the plans developed at the regional level.

The purpose is to maintain continuity in air quality planning and to avoid duplication.

The air quality management section of the proposed Amendments also contains a list of control strategies and a requirement that each be studied. Some versions also require that such strategies be included in each plan. While we support the investigation of a wide range of alternatives we strongly oppose the idea that each area must implement some version of each alternative, since many of the options listed could be expected to be unworkable in numerous areas. We also believe that such a requirement would defeat the purpose of the proposed requirement for impact analysis. The purpose of impact analysis should be to identify beneficial and adverse effects of the alternatives under question, thus indicating whether or not an alternative is acceptable. Although adverse impacts often can be mitigated to some extent, there will be many occasions when the benefits are marginal and/or unavoidable adverse impacts are significant. In such cases, the appropriate action is to reject the alternative, not to implement its least objectionable form.

The document submitted as a plan should include discussion of alternatives considered, evaluation of alternatives, specific commitments to implementation, and discussion of future planning activities -- i.e., what has been considered; what has been selected, and why; how the selected options will be put into effect; and what will be done next. Without the inclusion of this information, adequate evaluation of a plan is impossible.

Thus, an air quality management plan should

- discuss the proposed short- and long-term projects and programs to achieve air quality;
- evaluate these projects and programs as to their social and economic effects, public comment, etc;
- indicate responsibility for planning and implementation (what agencies, etc.);
- list sources of funding and other resources available for planning and implementation;
- discuss alternatives which were considered in developing the plan and summarize their costs and benefits;
- make a definite implementation commitment for the next time

period, indicating specific responsibilities, funding sources, etc;

- indicate what will be investigated or planned for over the next period, with responsibilities, funding sources, etc., spelled out;
- indicate what long-term planning activities will be going on;
- state what will be done should monitoring show that the implemented programs are falling short of goals.

E. SANCTIONS

The proposed amendments provide that any area not in compliance with the requirements for maintenance planning and implementation would be denied certain federal funds. This represents a major change from the current Act, under which EPA is required to produce acceptable plans for states failing to do so themselves, and enforcement of plans is left to court action.

The requirement that EPA develop air quality plans has been an onerous one. It has stretched EPA's resources thin, and has resulted in plans having little support in the areas upon which they were imposed. Thus, the EPA plans requiring state and local governments to take certain actions have met with considerable resistance. Such plans also have been challenged successfully in the courts;[4] the majority of circuits that have ruled on the issues have rejected EPA's claims of authority to require the states to spend money or pass legislation. If these decisions stand, EPA will be left only with the authority to actually implement control strategies itself, i.e., run its own inspection and maintenance programs, carpooling programs, etc. Even if EPA does have the right to require that the SIP be implemented by the states, the current sanctions--injunctions and contempt orders against state officials--are so drastic as to be unusable.

The sanction of cutting off certain federal funds from an area not in compliance with needed air quality plans is the most workable one to appear thus far. However, care should be taken not to cut off funds which would be needed to implement desired plans. It is recommended that the sanction be as follows:

- No federal funds from the specified program could be expended in a non-complying area on any plan or project which is inconsistent with the area's air quality needs.
- One element of this consistency determination would be whether first priority had been given to all planning and projects necessary for attainment and maintenance of air quality standards in the area.

Thus, for example, an area not in compliance with its TCP would be eligible for federal transportation funds for its TCP elements, but would be eligible for other transportation funds only upon a finding by EPA that such expenditures would not delay attainment or interfere with maintenance of the air quality standards. This would not shut down federal programs, but would limit them in a recalcitrant area until such area was in compliance.

F. PROCESS GUIDELINES

A proposed amendment requires each air quality management planning organization to set up "a continuing air quality management planning process" within one year of the designation. Little is said, however, about the desired attributes of the planning process. Yet this process is the prime determinant of the quality of the plans it produces, their political acceptability, and their potential for full realization.

It is recommended that language be added requiring that within one year of designation, each AQM agency submit for the Administrator's approval a document describing its air quality management planning process. In addition, language should be inserted which briefly specifies topics to be discussed in this document. For example, the document should describe procedures and assignments of responsibility for

- the identification and consideration of alternative courses of action;
- identification of social, economic, and environmental effects of the alternatives;
- involvement of, and information exchange with, other agencies, the general public, and affected interest groups throughout the planning process;
- coordination of AQM planning with other ongoing planning processes, and resolution of conflicts among programs;

- monitoring the effects of AQMPs as they are implemented;
- revising AQMPs to reflect changes in conditions or new information.

The document also should identify:

- the process of reaching decisions on air quality strategies, and the authority and responsibility, if any, which other agencies or officials can exercise over decisions;
- sources of funding and other resources for planning and for implementation, including any interagency agreements for sharing such responsibilities.

More detailed guidelines could be left to administrative regulation.

FOOTNOTES - SECTION VI

1. See Appendix III.
2. Clean Air Act, 42 U.S.C. 1857 et seq.
3. Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 et seq.
4. District of Columbia v. Train, 8 ERC 1289, October 28, 1975.

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APPENDIX I: THE POLITICAL CONTEXT OF TRANSPORTATION PLANNING

A. INTRODUCTION

The comprehensive planning approach has been the subject of much criticism over the past decade or more. Much of this criticism has focused on the technical analysis tools and methodologies used for developing alternative plans, forecasting traffic and other impacts, and evaluating plan alternatives. However, a more fundamental criticism, and one that in large part motivates the search for improved methodologies has been that the master plan simply does not reflect how decisions on transportation improvements will actually be made. The implications of this criticism go far beyond mere improvements in technical analysis tools to the very nature of the planning process, the definition of what a plan should be, and the emphasis placed on technical versus non-technical factors.

B. MANY INTERESTS VS. THE "PUBLIC" INTERESTS

A basic tenet of comprehensive planning is that there is an identifiable public interest or set of goals and objectives for regional or state transportation (and land use, etc.). This public interest is assumed to transcend the more parochial interests of particular groups defined either as other political jurisdictions (e.g. local governments) or simply some segment of the population (e.g. business interest, transit users, etc.).

The reliance on the concept of a homogeneous and consistent public interest is a critical limitation of the master planning approach. Ironically, the most substantial support for such an approach came from reform groups reacting against the piecemeal and partisan land-use and transportation development policies of big city machine governments during the 1920's and 30's.[1] Later, elements of these same groups turned against the master plans that were adopted because they didn't reflect the reformer's vision of the public interests.

From a theoretical point of view, Arrow (1963) demonstrated the impossibility of developing a social welfare function, or a calculus for determining the public interest, except under the most stringent conditions. Unless all individuals had identical welfare functions or the same relative preferences for all objectives, the concept was unworkable.

From a more pragmatic point of view Altshuler (1965) suggested that regardless of the existence of a common public interest in theory, the political implementation of that interest might well be impossible in any case. The assumption that common interests were preeminent conflicted with the benefits of the established democratic traditions of placating specific interest groups, majority rule, and interparty conflict. In fact, Downs (1957) had suggested much earlier that survival at the ballot box rather than pursuit of some common interest was the most important motivation for politicians and political parties.

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[1] Caro (1974)

Altshuler's case study of planning in Minneapolis confirmed the notion that the political decision-making process did not operate with a unified view of the public interest in mind and that an operational definition of such an interest might be impossible.

Similarly, Braybrooke and Lindbloom (1970) critique the "rational model" of decision-making and the use of a social welfare concept for evaluating policy alternatives as simply beyond the capability of the political decision-making process. Most policy decisions are incremental and a key reason is the need to recognize not only multiple and conflicting values but the fluidity of these values as well.

A number of studies, which document the organizational and procedural problems of specific metropolitan comprehensive planning efforts, cite the lack of any real consensus on area wide goals and objectives as a key frustration of the planners and prime reason that plans for the most part were adopted and then forgotten.[2] A more detailed review of the methodologies and technical analysis involved in several metropolitan planning studies found statements of goals and objectives were simply too general to be meaningful.[3] These general goals led to plan alternatives which were not particularly distinguishable given the evaluation criteria and methods employed.

During the time the usefulness of the master plan concept was being debated and tested, a related debate was occurring in the field of urban politics. The issue was not whether there existed a single public interest transcending all groups, but rather which group's interests were reflected in the complex political decision-making process. In an epic study of Atlanta, Hunter (1953) determined that an economic elite ruled that city's politics. In contrast, Dahl (1961), in a study of New Haven, found the political process to be pluralistic with different interests involved in various public policy issues with no one group dominating.

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[2] See Zettel and Carll (1962) and Levin and Abend (1971).

[3] See Boyce, Day, and McDonald (1970).

Hunter was criticized for his "reputational" methodology which seemed to preordain a finding of an elite. Bachrach and Baratz (1962) felt Dahl, by focusing on explicit policy decisions, ignored the potential influence of an elite in limiting the political agenda to safe and acceptable issues. Though the debate has never been settled conclusively, it focused on an issue with great significance for planning. Whether an elite or a set of pluralistic interests currently has entre to the decision-making process, it seems clear that different interests have different objectives in each area of public policy including transportation. Furthermore, in a democratic system each of these groups should at least be guaranteed access to the decision-making process.

Haar (1959) raised the issue of whether a master plan could reflect effectively many interests particularly in an adversary process such as litigation on zoning variances. Davidoff's (1965) call for advocacy planning recognized planning as merely one technique for persuasion in an overtly partisan political process. Later work calling for citizen participation also sought to safeguard the legitimacy of many points of view.[4] These calls for open planning and subsequent Federal laws, planning regulations, and court rulings reflect to some extent an institutionalizing of a situation already precipitated by grassroots citizen organizing efforts such as the Boston case.[5]

Currently, transportation planning recognizes the potential existence of many interests and their right of access to the decision-making process. In fact, Altshuler (1974) in a recent paper, while not retreating from his support of participation, argues that the mechanisms available to citizen groups may have diluted the locus of power to such an extent that implementing public works, and particularly large capital projects, is almost impossible. The smallest minority may thwart, or at least endlessly delay, a project benefiting a vast majority given the legal channels available and the legal precedents already established.

Whether the pendulum has swung too far is not crucial to the discussion here. Rather, it must be recognized that many groups with different interests will continue to be involved in transportation decision-making in the future.

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[4] See Manheim et al. (1971) and Reno (1972).

[5] See Lupo,Colcord, and Fowler (1971).

C. INSTITUTIONAL STRUCTURE: FRAGMENTED ROLES AND PAROCHIAL INTERESTS

The previous section described a major flaw of the master planning approach as the implicit assumption that the decision-making process would focus on one public interest rather than many conflicting interests. Part of the reason for this misconception and another problem with many planning efforts at both the local and metropolitan scale is the position of the agencies conducting those studies within the formal institutional structure for transportation decision-making.

Metropolitan transportation studies generally are conducted under the aegis of voluntary Councils of Governments or metropolitan commissions without implementation powers or real authority over local governments or implementing agencies.[6] Similarly, at the local level, the planning commission, without a direct tie to the executive branch, is a major source of impotence of the city master plan.[7]

Thus the formal structure of institutions involved in the transportation decision-making process is a key determinant in the actual implementation of any plan. Institutional structure affects both the distribution of formal authority as well as the channels of communication through which that authority is exercised. However, since institutional arrangements are but one of many factors affecting the nature of the decision-making process, different institutional arrangements may be required in different metropolitan areas for accomplishing the same purpose.[8] Similarly, effective planning at the local level may occur under both reform and machine style government.[9]

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[6] See Levin and Abend (1971) and Colcord (1971).

[7] See Altshuler (1965).

In general, the existing institutional arrangements for transportation decision-making at the regional and metropolitan level can be characterized as extremely fragmented. Different levels of government (local, metropolitan, state, and Federal) are involved, or involved in different ways, in the planning, implementation, and operation of the various modes. While institutional structures vary from state to state and region to region a few generalizations are possible.[10] Traditionally, multi-modal planning has been an activity carried out at the metropolitan level though increasingly both states and the Federal government have become more involved. Major highway planning and construction has been primarily a state function. In contrast, transit planning, implementation, and operation has been a responsibility of local government or metropolitan authorities. In addition, many ports and airports are planned and operated by quasi-public authorities with bonding power and considerable insulation from public opinion.

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[8] A study by Colcord (1972) of different regions in California suggested different institutional arrangements were required in each.

[9] See Rabinovitz (1967) and Lineberry and Sharkansky (1971).

[10] Chapter 6 of the Neumann thesis describes in detail the institutional arrangements for transportation in the San Francisco Bay Area.

While the authority for planning and implementing highways and transit (in terms of project approval powers) is slowly being shifted to the metropolitan level, many institutional actors remain active in the decision making process. The effect of this fragmentation is to add another level of complexity to the implementation process. The previous section suggested that many groups have vested and often conflicting interests in transportation decisions. Added to these groups must be the multitude of agencies at all levels of government involved in transportation.

Increasing attention is being given to the role of public bureaucracies and the often parochial interests they represent in the decision-making process. Both Blau (1957) and Downs (1967) focus in detail on the internal forces and interests shaping the behavior of bureaucracies. While to some extent outside forces can influence such organizations, their size, operating procedures, and longevity represent significant constraints to any change in policy. Rather than viewing "red tape" as a necessary inefficiency of bureaucratic operations, such procedures and bureaucratic behavior in general can be seen as carefully tailored mechanisms for achieving specific organizational goals. In many cases these goals may be quite distinct from the original rationale and purpose for which the specific bureaucracy was created. Schon (1971) draws a similar conclusion and laments the inability of current organizational structures to respond dynamically to new problems.

Both Allison (1971) for international policy, and Dye (1972) for domestic policy, develop "models" explaining policy development and implementation as largely the output of various organizational actors. Each organization possesses a set of parochial interests and perceptions and standard operating procedures which limit the range of policy outcomes.

In short, given the multitude of agencies at all levels of government involved in transportation, it is important to recognize each of these organizations as distinct actors in the decision-making process, each with a set of interests which may be quite different from their official function. While current Federal planning regulations are focusing on the programming and budgeting process as a key lever for agency coordination, there is a limit to the cooperation that can be expected. As Pressman and Wildavsky (1973) note, if a common interest and ignorance are present, coordination merely requires pointing out a reasonable joint action. However, if conflicting interests are present, coordination is synonymous with coercion and a play of power and bargaining will result.

D. THE DYNAMICS OF DECISION-MAKING: A REVIEW OF THE IMPLEMENTATION PROCESS

In addition to ignoring the complexity of the interests, including the institutional interests, involved in transportation decision-making, the master plan approach reflects a very simplistic view of the dynamics of the decision process itself. The master plan implies that the decision process is capable of, and willing to make a one shot choice on a comprehensive development plan for a twenty year period. In fact, approval of a master plan is but the first preliminary decision, and often not a very significant one, in what is a time consuming, complex, and incremental implementation process.

Recognizing the need for policy analysts to pay more attention to the implementation process, Allison (1971) estimated that only 10% of the work of achieving a desired governmental action is done when the preferred analytic solution has been identified. Increasingly the complexity of successful implementation is being viewed as a key area for research with implications for both the type of programs that are desirable as well as how to accomplish them.

A case study of several Economic Development Administration projects in Oakland discovered that even the implementation of projects with a very high degree of initial acceptance can be frustrated.[11]

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[11] See Pressman and Wildavsky (1973).

What EDA staff hoped would be merely details of the implementation process, in the end turned out to be key determinants in both the ultimate design of the projects and their implementation prospects. Among the problems encountered were multiple clearance points, changing actors, dissolution of initial agreements, and the inability to move fast enough to take advantage of agreements while they lasted. The need for joint action among agencies with different priorities and perspectives produced endless procedural and legal problems. Inflation, changes in Federal and city administrations, and the steady erosion of the sense of urgency which launched the projects initially further compounded the delays. In the end only a fraction of the initial program was implemented.[12]

The woes of trying to implement a proposed policy or project are familiar to both practicing planners and operating agency personnel. However, to a large extent the problem has been assumed to be poor implementation efforts. Thus in response to ever increasing delays in highway construction the California Division of Highways commissioned a study to shorten project lead times. However, the failure to implement a project may reflect either poor implementation efforts or an ill-conceived or a too ambitious project.[13]

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[12] Safdie (1970) chronicles similar frustrations in trying to implement an innovative modular construction system for urban housing.

[13] Pressman and Wildavsky (1973) conclude that the Oakland project was in fact too ambitious given the maze of actors involved and time constraints.

Reflecting the dynamics of the implementation process in both the design of policies or plans and the manner in which they are carried out is extremely important in the transportation field. In almost every case transportation plans and projects face multiple decision points and long lead times. While this is especially true for capital projects, it holds for policy and operational changes as well.

In particular, a comprehensive twenty year master plan faces innumerable decision milestones. The implementation of any element of such a plan is hardly guaranteed by anything so illusory as approval of a plan. In fact, successful implementation depends on each project or plan element proceeding through a long series of decision hurdles and often within a specific time frame.

A particularly important decision point is the allocation of funds in the budgeting process. However, the budgetary process for public bureaucracies is extremely incremental and non-comprehensive.[14] Given the complexity of the budget, many items are accepted with little analysis and few alternatives are considered. The negotiating process is generally only concerned with allocations and impacts occurring within the next one to two years. While the PPB system provides a framework for increasing the time frame of budgetary decisions, it provides little guarantee that budget decisions are consistent with longer range programs.[15]

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[14] See Downs (1967) and Linesberry and Sharkansky (1971).

Of particular importance in the budget process is the previous year's budget. An agency's budget represents how the bureaucracy behaved and is an enormous capital investment in time, energy, and manpower. The major portion of any budget represents the results of previous negotiations and tolerable status quo if not 100% agreement. Thus current budget negotiations focus on incremental changes to previous allocations or completely new allocations and generally do not risk reopening questions on a majority of items.

Thus, as Federal regulations are beginning to reflect, the budget, rather than a long range plan, is the key driving force and focus of negotiation for the decision-making process. While there are many other important decision points such as environmental clearances, the budget process offers an ongoing pressure point for redirecting the overall program of an agency and is the best indicator of a change in direction.

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[15] See Novick (1967).

E. SUMMARY

Originally, planning, and particularly production of a master plan, was viewed as the first and a quite necessary step in a rational decision-making process. The basic argument supporting this view is that if there is no long range goal or end state toward which to direct current decisions a very piecemeal and myopic transportation system or development pattern will result.

However, the master plan approach implicitly assumes a decision-making process that in general doesn't exist for transportation. Rather than being strictly "rational," the process involves many conflicting interests, including institutional actors at different levels of government. Rather than focusing on master plans, decisions tend to be incremental and focus on budget negotiations and the stream of other implementation decision points that each plan element or project must face.

APPENDIX II. A REVIEW OF EXISTING PLANNING AND PROGRAMMING PRACTICE

A. INTRODUCTION

There has been an increasing awareness on the part of many planning agencies about the nature of the decision-making process and the need to develop plans which are more responsive to that decision-making environment. Similarly, the nature of the transport system and its impacts and interaction with other activity systems is better understood and stimulating a search for improved planning methodologies. As a result, significant changes in the nature of the planning process are occuring in many states and metropolitan areas.

For many years, states approached the issues and problems facing them with a sequential view of planning. System studies identified areawide financial constraints and corridor specific networks and the development of specific programs followed. Finally, particular project studies successively took each corridor study through location and design phases to right-of-way acquisition and finally construction.

The sequential view has its roots in the era when states were primarily concerned with highway captial improvements which had a relatively stable and dedicated funding source. Perhaps more than anything the 1973 Highway Act indicates how much the "ballgame" has changed. The Act provides increasing flexibility to shift funds between highway and transit, and, for the first time at the Federal level, separates a state's allocation for a portion of the fund in urban areas from particular projects. As a result, states can begin to be less concerned with getting specific projects through the "pipeline" and focus more on the effective management of a cash flow and on providing transportation as a "service."

Similarly, the creation of state departments of transportation is resulting in more active state involvement in modes previously the responsibility of local governments, regional authorities, or the private sector. On the other hand, in response to the need for both more effective participation by a diverse group of interests and coordination among modes and functions (e.g. planning, implementation and operation) many states are assigning more responsibility to regional planning agencies in the development of overall statewide plans and policy. The response has varied from state to state, and even within a state. The balance that evolves between a "top down" and a "bottoms up" approach will depend on the specific capabilities and interests of each state at the regional and state levels.

A number of additional changes to the planning process have occurred in response to both state and Federal environmental policy. State and metropolitan transportation planning agencies must monitor the consistency of programs and projects with respect to such issues as open space, air quality, noise regulations, and civil rights. In addition, states preparing plans are in many cases producing environmental impact reports for the entire plan. Other state agencies having state environmental, economic and agricultural responsibilities have an increasing concern for transportation policy and how it supports or disrupts their own program.

B. OVERVIEW OF THE PLANNING AND PROGRAMMING PROCESS

A complete description of the transportation planning process in a particular state or region involves a complex set of factors from organizational and legal structures to specific technical activities and procedures. Such descriptions are provided in a number of sources for different states and regions.[1] The focus here is on describing the general activities involved in planning and implementing transportation improvements. The current scope of these activities in most state and metropolitan transportation planning agencies remains a major barrier to improving the effectiveness of transportation plans in addressing the issues raised in the previous chapter.

Figure 1 displays the major activities to be discussed here. The specific activities shown, such as system planning, program development, project planning, etc., are most frequently discussed for major capital improvements. However, the more general activities of planning, programming, implementation and operation occur for non-capital options as well.

Financial planning includes the forecasting of revenues, often for both the short and long run and the analysis of alternative revenue sources such as bonding, user taxes, or general funds. A key issue is the distribution of costs that a particular revenue source places on

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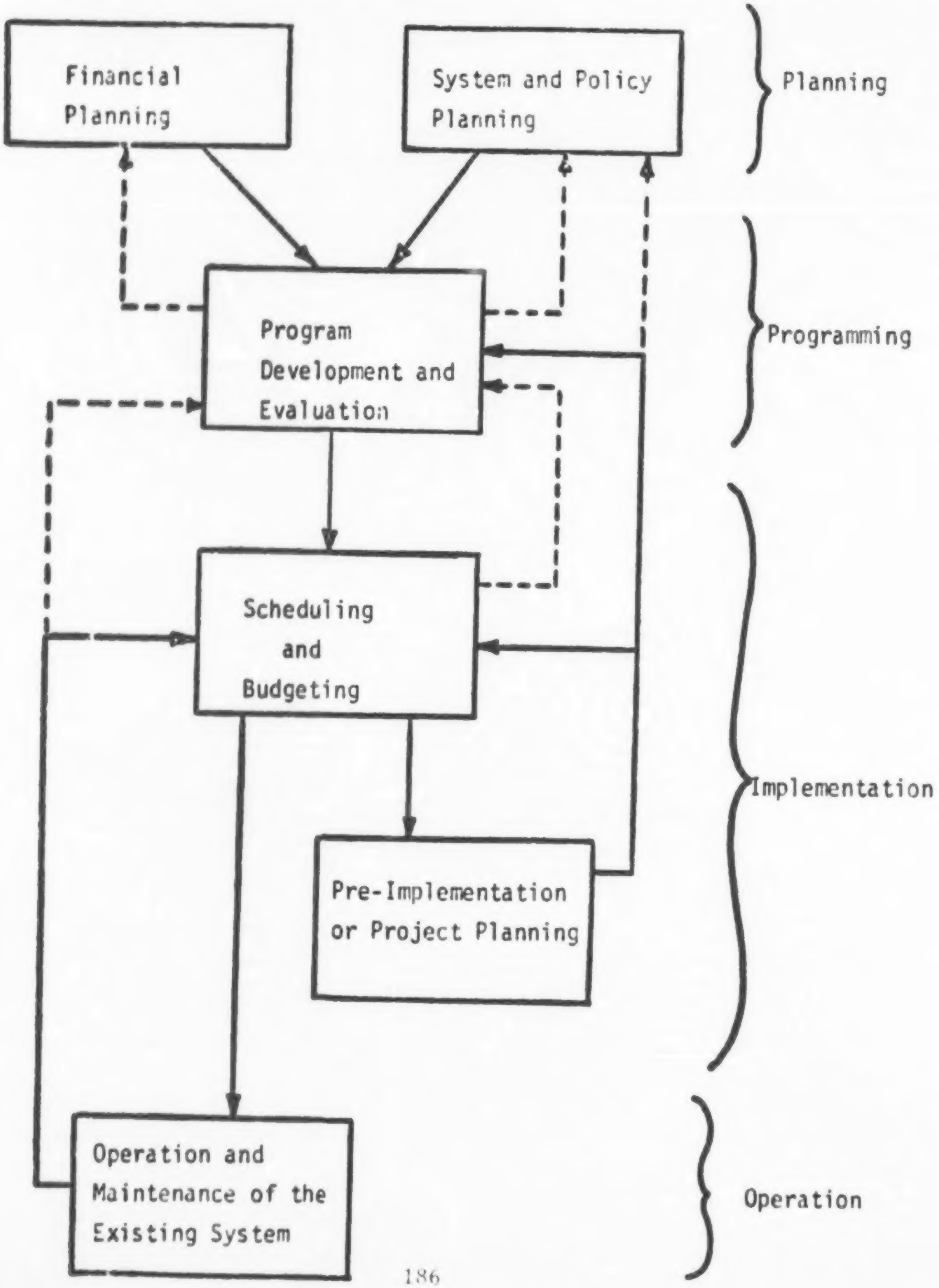
[1] See Mead (1973), Krejci (1973), and Neumann (1972) for more detailed description of the overall planning process in California, Massachusetts and Georgia.

Figure 1 Major Activities in Transportation Planning


Financial Planning
System and Policy Planning
Planning
Program Development and Evaluation
Programming
Scheduling and Budgeting
Implementation
Pre-Implementation or Project Planning
Operation and Maintenance of the Existing System
Operation

users and non-users or different income groups. Naturally in many cases funding sources are severely constrained and any change may require new legislation. In addition, financial planning is concerned with the allocation method by which funds are distributed to various jurisdictions, modes, functional systems or functional uses (e.g. interstate vs. primary, capital vs. operating, etc.).

System and policy planning includes the generation of potential capital, operating, maintenance and policy changes and an analysis of the potential impacts of such changes. While there are many sources for proposed improvements, master planning, needs studies, and sufficiency inventories are the most widely used approaches for generating capital projects. Generally less formalized and more "ad hoc" procedures are used to generate short range non-capital options. Currently concern for energy conservation and air quality regulations are the prime stimuli in the search for non-capital projects.

Programming takes the output of the financial and system planning activities and produces a tentative sequence for implementing those options identified and approved in the planning phase. Given the long lead times and many pre-construction development phases for capital projects, a set of well-defined procedures have been developed for capital investment programming. These procedures include priority setting and scheduling. However, the matching of resources for implementation and a proposed schedule of implementation occurs for all options even though formal documentation of a program of policy and operating changes often has not been developed. Naturally programming whether formal or not must reflect the myriad political, legal and financial constraints that exist for different types of improvement options.

Scheduling and budgeting are essentially refinements to the programming activity for the near-term portion (one to two years) of a program. For capital projects, scheduling accounts for detailed manpower assignments and adjustments to the sequence of projects due to unforeseen delays and fund shifts, etc. Similarly, budgeting produces a one to two year detailed account of expenditures using up to date and short range revenue estimates not required to scope out an initial program.

Pre-implementation and project planning include those activities or development phases necessary to prepare an option for actual implementation. For capital projects, there is a well defined set of development phases including location and environmental impact studies, design, right-of-way acquisition and construction. Again, however, non-capital projects generally face a similar though less well defined and repetitive set of development phases. For example, policy changes may require drafting and lobbying for legislation, a public referendum, or small scale demonstration applications, etc.

Operation and maintenance involves repairing and operating the existing transportation system and may be the activity most affected by policy and non-capital improvements.

Naturally, each of the activities described above may involve agencies and actors at many levels of government. Also, as mentioned previously, there is a tendency to treat the activities as strictly sequential, while actually they often occur in parallel or iteratively. Figure 2 is intended to represent the dynamic nature of these activities in most states, with information flowing between various levels of government. While the diagram is typical of a state such as California or Connecticut, which place strong emphasis on regional plans and programs, it clearly over-simplifies the process. The levels of interaction, amount of information and degree of regional-state responsibilities will vary by state and region.[2]

As the figure shows, a similar set of activities occur at the state and regional levels with periodic interaction between levels. Typically, both state and regional plan alternatives are developed. In California, state plan alternatives were not prepared until there was substantial progress on the preparation of regional plans. Conflicts between state and regional objectives were resolved by negotiation, identified as an issue to be resolved in future plan updates, or submitted to the State Transportation Board for final resolution.[3]

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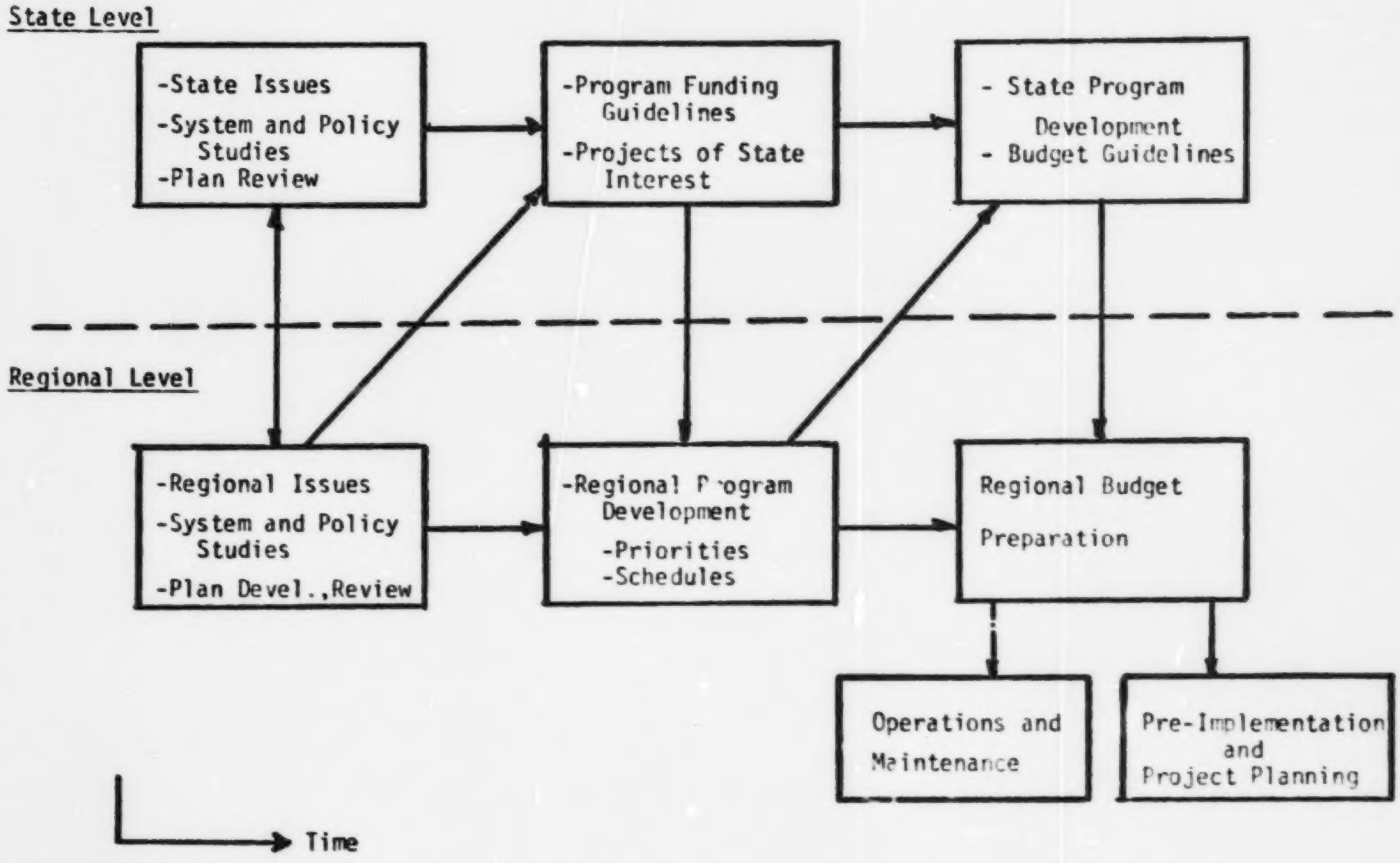
[2] A more detailed description of process dynamics among state and regional levels can be found in Neumann (1972) for California and in Krejci (1973) for Massachusetts.

[3] This latter mechanism was avoided during the first cycle of plan development in California.

Figure 2 Interaction of State and Regional Levels in Transportation Planning


State Level
-State Issues
-System and Policy Studies
-Plan Review
-Program Funding Guidelines
-Projects of State Interest
- State Program Development
- Budget Guidelines
Regional Level
-Regional Issues
-System and Policy Studies
-Plan Devel.,Review
-Regional Program Development
-Priorities
-Schedules
Regional Budget Preparation
Operations and Maintenance
Pre-Implementation and Project Planning
Time

Once plan alternatives are adopted program funding guidelines are produced at the state level for each region and used as budget constraints to develop regional programs. In California, for the highway mode, the regional plan alternative (a target system statement of facility needs) partially determines the level of funds each region receives. Regional programs must reflect local priorities and lead time constraints as well as fund guidelines.

A statewide program must reflect up to the date fund information including the current status of Federal reimbursements. Thus, preparing the state program generally involves adjusting regional programs to insure inter-regional consistency and reflect current fund estimates and state priorities. State budget guidelines provide each region with a detailed 1-2year fund estimate and regional programs are adjusted prior to funding specific project studies or operating and maintenance activities.

Over the past few years a number of significant changes have occurred in the overall planning process and specifically the system planning, programming, and project or pre-implementation planning activities. First public participation has increased dramatically particularly during project planning but also during system planning and increasingly due to recent Federal regulations in programming as well. The attention being given environmental and social concerns has also increased. Due to NEPA, specific project studies have been the focus of initial efforts at detailed environmental analyses but increasingly state and regional system plans are also reflecting these impacts.

Due largely to Federal funding practices and the integration of UMTA and FHWA planning regulations, coordination of planning and programming activities for each mode is increasing among state, regional, and local levels of government. Also, due primarily to the Clean Air Act provisions the consideration of non-capital and short range options is beginning to be coordinated with longer range and predominantly capital system plans.

Finally, within modes, better integration among system and project planning is also beginning to occur. For transit the primary impetus is UMTA capital grant criteria which stress analysis of a project as a stand alone incremental improvement as well as a portion of some longer range plan. For highways court rulings have rejected the practice of segmentation (e.g. construction of major improvements in a long series of staged segments) without an assessment of environmental impacts of both the segment and the more major long range improvement.[4]

All of these changes represent significant improvements and increase the potential for planning to be responsive to the decision-making environment. However, to a large extent these changes still represent untapped potential. In particular the process, the procedures, and a style of planning which would allow both a focus on short range programs, budget decisions, and non-capital options and also the longer range implications of these choices have not evolved. System studies still are dominated by a master philosophy. Regulations focusing on short range programs and project increments provide no real mechanism to tie these choices to long range planning and a sequential view of these activities remain.

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[4] U.S. Rt. 7 in Connecticut, Massachusetts and Vermont has been the subject of a "segmenting" ruling and more recently I-93 in New Hampshire has been similarly affected.

Part of the problem is a reluctance to view the entire range of planning activities in Figure 1 as a very dynamic and iterative set of tasks. The illusion of stability provided by a comprehensive long range plan is very seductive. However, plan-making alone does not begin to characterize a state or region's range of involvement in transportation. In fact, plan-making only can serve to punctuate a complex iterative, and incremental implementation process and is but one mechanism for providing coordination among a diverse set of state, regional and local actors.

C. OVERVIEW OF CURRENT PLANNING AND PROGRAMMING PROCEDURES

The previous section described the key activities involved in the planning process and the interrelationships among them. The purpose of this section is to examine the proceudres used in a number of these activities to address the technical issues (e.g. budget constraint, impact dependencies, etc.). In particular, the procedures used in system planning and programming are of interest since the other activities (with the exception of capital project planning) are less formalized and represent less of a constraint to new planning approaches.

In theory as Pecknold (1970) notes it is possible to describe an analysis framework which addresses all of the relevant technical issues in terms of the general sequential decision model. However, in practice, it is simply impossible to identify a consistent set of operational models or procedures which can address all these issues simultaneously for anything but the most trivial problems. Thus it is not surprising that existing procedures focus on only one, or some subset, of the technical issues of concern. However, the manner in which these issues are fragmented by current system planning and programming methodologies represents a constraint to realizing the potential improvements embodied in current Federal planning regulations.

1. System Planning

Traditionally, system planning has involved long range capital facility planning. More recently, short-range and non-captial options have received increasing attention due both to methodological advances in demand forecasting and the emerging policy issues dealing with energy and air quality. Since a number of extensive reviews of current methodology are available, the discussion here only briefly surveys the more widely used approaches for plan development, network analysis, and plan evaluation.[5]

The most popular techniques for plan development during the 1960's were the "plan-form" approach (e.g. linear-city, satellite city, etc.) and the use of transportation and land use models to generate land-use patterns given transportation policies or vice versa.[6] These techniques were found to be too aggregate to deal with many policy issues and often were insensitive to the issues they explicitly tested. Thus many different network configurations could serve the same basic land-use pattern. While part of the problem was lack of good evaluation methods, the differences hypothesized for different master plans were overstated. Despite this shortcoming some recent metropolitan studies have employed similar techniques.[7]

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[5] More detailed surveys can be found in Pecknold (1974) and NCHRP "Synthesis of Highway Practice #14" (1972).

[6] See Boyce et al. (1970).

Other techniques used to generate long range plans or to update already adopted master plans are needs and sufficiency studies. These techniques are widely used at the state level for the highway mode and need studies have been conducted at the Federal level for all modes. Sufficiency studies are inventories of current structural, capacity, and safety deficiencies on the road system and require a set of standards for measuring these factors. Need studies are similar and based on prescribed levels of service. Where service levels are not met there is a deficiency and the improvement needed to restore or maintain the service levels is identified. Need studies and to a lesser degree sufficiency studies suffer a number of major weaknesses. By assuming service levels, needs studies inhibit the examination of environmental and social impacts and treat all user groups equally. In fact, needs are relative, not absolute, and vary significantly for different groups. By assuming standard solutions where deficiencies exist, need studies result in capital intensive plans and inhibit the search for alternatives. Finally by treating projects independently need studies assume unlimited resources are available.

A recent proposed approach provides a mechanism for introducing the budget constraint in developing and evaluating multi-modal target year plans.[8] In a recent application of economic analysis techniques, California "down scoped" the traditional needs study for highways to obtain a somewhat more realistic master plan.[9] However, whether or not the resource constraint is explicitly considered, most state and regional plan development efforts still reflect the master plan philosophy.

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[7] For example, in California, San Diego has adopted what is essentially a land-use and transportation master plan using the PLUM land-use model.

Due to the complexity of the technical issues discussed and the lack of suitable methodology, most long range planning impact analysis has focused on network analysis. Implicit in this approach is the assumption that network dependencies are very important and affect both network configuration and link or project design. Traditional approaches also imply that these effects can be considered in a one shot manner for a target system. Thus timing dependencies, due to budget constraints and uncertainty are assumed to be negligible relative to network effects or are assumed likely to affect only the sequence of implementation (e.g. a programming issue) and not the target system itself.

The traditional methodology for network analysis has been widely criticized for internal inconsistencies, lack of policy sensitive variables, cost, and data requirements, etc.[10] No elaboration of these critiques is required here other than to repeat that such techniques emphasize network dependencies at some target year while ignoring the other technical issues. Recent efforts to streamline the use of large network analysis techniques have focused on the development of "sketch planning" tools. Such techniques offer a more flexible and less costly (both in time and data) approach to network analysis.[11] However, the techniques used in most states still are the more cumbersome large scale network models. In a few states these aggregate models are being coupled with models to predict other flow related impacts.[12]

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[8] See Creighton, Hamburg, Inc. (1972).

[9] See McKinsey and Co. (1974).

[10] Critiques of transportation models can be found in Roberts (1970), Manheim (1973) and good summary is in Pecknold (1974). The weaknesses of the land-use and transportation models are discussed by Lee (1973) and Boyce et al. (1970).

More promising at least for the trip generation, distribution and mode split portions of network analysis, are disaggregate techniques. Results from the application of these models have been reported widely and are beginning to be used in actual studies.[13] Disaggregate techniques offer a more behavioral and policy sensitive analysis tool while at the same time reducing cost and data requirements. The emergence of of this approach has coincided with an increased emphasis on short range, non-capital options due to air quality and energy considerations. Disaggregate models offer a great potential for introducing short range options into system planning studies. In addition, recent work suggests a disaggregate approach can also be applied to longer range mobility choices involving residential location, household type, mode choice to work, and auto ownership.[14]

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[11] Sketch planning techniques are discussed extensively by Mergel (1974) and Landau (1975).

[12] Wachs (1972) recommends a concentration on local link analysis, accessibility parameters, and disaggregate equity considerations.

[13] Iecknold (1974) surveys the current status of the disaggregate approach. A key issue in using such techniques for prediction is the consistent aggregation of the disaggregate results; see Koppelman (1975).

Where other impacts, and particularly land use, environmental and social effects have been examined in system studies, they have been analyzed in a one shot manner for different target systems.[15] Thus it is not surprising that formal plan evaluation approaches have emphasized aggregate criteria and have not been particularly successful. In many cases, little formal evaluation at all has occurred during many system studies.[16]

2. Programming

Similar to system planning, only some subset of the technical issues have traditionally been addressed in programming. The major issue addressed is the budget constraint, though often projects have been scheduled in a myopic fasion. Sometimes timing effects, impact dependencies, uncertainty and a broader range of priority criteria have also been considered; but generally programming has been viewed as merely the somewhat mechanical process for implementing a long range master plan.

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[14] See Lerman (1975).

[15] As Pecknold (1974) discussed the relationship of transportation to many of these impacts is still not well understood and good analysis tools for long range system effects are not available. Schiff (1973) surveys impact techniques.

[16] See both Boyce et al. (1970) for an overall review and Barton Aschman (1972) for a critique of specific evaluation methodologies considered for recent regional planning efforts in California and elsewhere.

Traditionally, there have been two basically different approaches to highway programming until recent Federal regulations required a minimum of a 3-5 year program for metropolitan areas (it can have a longer time frame). The first approach, popular in many predominantly rural states, though also characteristic of some urban states such as Massachusetts, involves informal negotiations over project priorities and schedules utilizing few if any systematic analysis procedures. Such an approach obviously can account for subjective factors and political differences. However, it can also degenerate to simply a "pork barrel" operation with no systematic method of addressing budget or impact dependencies, or using explicit priority criteria. It is also impossible for anyone not privy to negotiations to know what factors have been considered and thus can frustrate attempts at broad based participation in what are key policy and project decisions.

The second approach relies on explicit priority criteria along with some mix of formal or informal procedures for developing project schedules in light of these priorities and other factors. Most states are currently utilizing some priority criteria for highways, though other modes still tend to be handled in a more informal fashion. In 1973, reacting against the political nature of the state's highway programming process, the Arizona legislature established a highway priority commission charged with developing a formula for highway priorities. While few states have gone to this extreme, most have adopted similar approaches.

The following discussion of programming techniques only applies to states which have explicit and well defined programming approaches. In addition, the techniques deal only with capital projects, since for the most part the programming of other improvements is less formalized.

The most popular approach to programming currently is the use of some set of priority indices based on user benefit, structural, safety and other factors to rank projects within each funding category. In some cases overall "scores" are calculated as in Arizona, Tennessee, and Wisconsin. In California, separate indices are not combined. Also, some states such as Arizona combine technical and non-technical factors while California updates technical priority lists in a more subjective manner.

While the individual priority measures can often be useful, the practice of computing overall scores conceals more than it illuminates and has been widely discredited.[17] Unfortunately, new and ever more elaborate priority scoring techniques continue to be proposed as "objective" scheduling procedures.[18] In addition, some of these procedures include a measure of community preference in the score as well.[19]

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[17] See Manheim (1975) and Cohen (1976).

More recently, a number of states have applied benefit cost analysis to highway capital programs. Utilizing such a technique, California has"down scoped" district programs to reflect lower revenue projections and increasing project costs.[20] Similarly, Massachusetts and Michigan have operational benefit-cost and capital budgeting packages which can be utilized for project selection.[21] While restricting attention to traditional user benefits, such techniques offer one method for dealing with multiple funding constraints, multiple time periods, and multiple project design scales (e.g. mutually exclusive project alternatives).

Though capital budgeting techniques must rely on extensive project data bases, many states collect much of the required data as part of the National Transportation Study. Currently, FHWA is in the final stages of developing an investment analysis and programming package using needs study data and aimed at application at the statewide level.[22] In addition, a recent study done for NCHRP represented a preliminary attempt to define benefit-cost criteria appropriate for multi-modal economic evaluation.[23]

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[18] See General Analytics and Comsis (1973) and Mak (1973).

[19] Again see Mak (1973).

[20] See McKinsey and Co. (1972).

[21] See Juster (1974).

A class of techniques which have proved extremely useful for program development are computer based information systems. Such systems allow quick response to a variety of issues and can provide summaries (cost, phase of development, etc.) of the projects in different geographic areas, funding categories and functional systems. The financial effects of program additions and deletions can be readily monitored and produced in formats appropriate to meet a variety of periodic state and Federal reporting requirements. The sophistication and capabilities of such systems vary greatly. For example, Massachusetts is utilizing a relatively simple and inexpensive system to monitor "active" projects and provide lists of projects by functional system, jurisdiction, phase of project development, etc. California utilizes a system with video consoles which allow the user an interactive capability of adjusting project schedules, budgets and displaying the effect on county and district programs. Other approaches are geared toward more detailed project scheduling and manpower assignments.

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[22] The FHWA methodology is known as the Highway User Investment system (1975)

[23] See Creighton-Hamburg (1972).

In a period where program development and review is being emphasized as a mechanism for coordination among modes, levels of government, and short and longer range plans, expansion of project information systems can be instrumental in providing information to a complex negotiating process. Such systems can support a very flexible scheduling process without relying on economic efficiency or other simplistic criteria to generate initial programs.

D. A COMPARISON OF PLANNING AND PROGRAMMING IN CALIFORNIA AND MASSACHUSETTS

The review of current planning and programming practice in the previous sections recognized that significant variations exist in both the planning process and the procedures used from state to state. In many cases, these variations imply that different changes are required to improve system planning and programming in different states. In other cases, the basic change may be the same but the tactics for implementing that change may vary from state to state.[24] To identify some of the key differences among states the current practice in two basically different states, California and Massachusetts, are summarized here.[25]

In recent years, both California and Massachusetts have increased the role of regional planning agencies (RPA's) in the transportation planning process. While current Federal regulations are making a shift of some authority to regional agencies mandatory, both states already had taken steps in this direction. Beyond this increase in the role for regional agencies, there are few similarities between current planning practice in the two states.[26]

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[24] It is also recognized that significant variations can occur from region to region within a state. However, such variations are not discussed here. See Colcord (1972) for a review of regional differences in transportation decision-making in California.

[25] A more detailed description of the California planning process as it relates to the San Francisco area is contained in Neumann (1976).

The system planning process in California is very decentralized with major differences occurring in the political culture of the state's diverse metropolitan areas. No one region dominates the state and most of the substantive planning work for all modes occurs in the eleven California Department of Transportation (Caltrans) district offices, regional planning agencies, or special regional authorities for transit, ports, and airports. The civil service at all levels of government in California is very professional and of high calibre.

In contrast, Massachusetts is dominated by the Boston area with planning for that region, and throughout the state, centralized at the state level. State agencies have a controlling vote on the committee overseeing the designated metropolitan planning staff. However, Massachusetts does not have a state department of transportation comparable to Caltrans and institutional relationships are extremely fragmented. The civil service system is a haven for political outcasts and much of the substantive planning work is contracted to consultants.

The dynamics of the planning process in California are punctuated by a number of well defined decision points or documentation requirements. For highways, a statewide needs study is conducted every four years along with a report recommending revisions to the state highway system (256 Report). In addition, multi-modal plans for the entire state and for each of the 41 regions are to be submitted to the legislature in January, 1976. These plans are to be reviewed and updated biennially.

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[26] It should be mentioned that California has significantly increased the authority of RPA's in large part due to the political power of local cities and counties. Massachusetts, on the other hand, has only granted RPA's some additional review powers. In California cities and counties have a veto power over major highway improvements while no comparable authority at the local level exists in Massachusetts.

Again in contrast, system planning in Massachusetts has no well defined cycle of activities and is largely undocumented. Project lists are submitted periodically by each Department of Public Works district when "jobs" are needed. These lists are not released to thepublic and nothing like the California needs study or the state and regional plans are an integral part of planning in Massachusetts. The most recent and well publicized planning exercise in the state, the Boston Transportation Planning Review (BTPR), did represent something of a "watershed" in Massachusetts planning. However, while the BTPR has led to some new ongoing planning activities, it was largely a "one-shot" effort from which a number of specific facility planning studies have spun off.

In terms of funding structure, both states have dedicated highway funds. California diverts half of these funds directly to cities and counties and both local and state road improvements are financed on a "pay as you go" basis. In Massachusetts, a much smaller percentage of funds are reserved for local improvements and the state retains some discretion in their use. Major highway construction is financed by bond issues every 2 or 3 years and some fuel taxes support state departments with no direct connection to transportation.

Both states provide support to transit; California by a fuel sales tax and diverting fuel taxes from highways and Massachusetts used general funds to pay half the deficit of the metropolitan Boston transit system.

The most important difference in funding structure between the two states is the method used for the allocation of funds to regions and specific improvements. In California there are significant legislative constraints on the distribution of funds to regions and counties within the state. Allocation of highway funds depends to some extent on regional lists of highway needs and state funds for transit go to the county of origin. Also, an 8 to 12 year tentative schedule of allocations to specific projects is developed.

In contrast, Massachusetts has much less well defined restrictions on the allocation of funds to regions or projects. Regions are given no indication of the funds they can expect when proposed projects are submitted to the state. No explicit program of projects has ever been produced and the legislature passes accelerated highway program bond issues every 2 to 3 years without any public documentation of the projects proposed to be financed.[27]

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[27] For a pending accelerated bond issue the legislature requested a listing of proposed projects but the secretary of transportation has resisted making such commitments public.

Not surprisingly, the programming process in each state reflects the differences mentioned above. Thus in California statewide programming for highways has been explicit and long range in nature. As mentioned previously, an 8-12 year planning program is produced as well as a 5 year financial plan and a yearly budget. While program decisions reflect many subjective and undocumented factors, a number of technical priority indices are used as well as a more comprehensive economic analysis methodology.

In Massachusetts explicit programming is almost non-existent despite an increase in the technical tools available to the state in recent years.[28] Program decisions are arrived at by a closed negotiating process with the results often undocumented and available publicly only on a year to year basis.

In summary, while both California and Massachusetts are attempting to improve transportation planning, the results in each state strongly reflect political and planning traditions. In California, the planning process is explicit, public, and well defined. While local government has a strong voice in decision-making a highly professional civil service has had a tendency to view the planning process as predominantly a technical activity.

Any continuing planning activity in Massachusetts is very difficult to define either in terms of a cycle of activities or periodic documentation. A closed political process predominates and it is often difficult to determine the influence of various interest groups including local governments. A poor quality civil service and technical analysis capability reflects this tradition of viewing planning as an activity to be conducted behind closed doors.

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[28] A proposed approach to programming as well as specific technical tools have been provided to the state as a result of a recent study. See Roos and Pecknold. et al. (1974).

E. SUMMARY: KEY PROBLEM AREAS

The review of planning and programming practice, in general, and the specific comparison between California and Massachusetts provided an overview of the nature of the current process and procedures used as well as an indication of the variations in practice from state to state. Recently the planning process has become more public and to some degree more responsive to a broad range of social and environmental concerns. To a large extent, these improvements are due to state and Federal legislation and planning regulations as well as continual pressure from well organized citizen groups.

Similarly the improvements in technical analysis tools required to support a more public and multi-objective planning process are beginning to be developed. In some cases, improved techniques have been applied in a variety of states. Other improved analysis procedures are not only beginning to be implemented but offer much potential for improved planning practice.

While improvements occurring to current practice are increasing the responsiveness of planning to an open political decision-making process, several key problem areas remain. First, while a number of factors are shifting the focus of planning activities to short range programs and non-capital options, the mechanism for relating short range decisions to longer range plans has not evolved. Program review, air quality standards and energy considerations can be effective in encouraging planning efforts to recognize the short range nature of the decision-making environemnt. However, unless ongoing long range planning activities are carefully integrated with these short range efforts valuable information will be lost to the decision-making process.

For example, the Environmental Protection Agency (EPA)currently is considering whether to use project by project review or a long range "3C" plan certification process to assure that metropolitan areas maintain or improve air quality standards. With a project by project approach it is difficult to consider other actions which may make the current project more or less acceptable at some point in the future. However, certification of a long range plan provides no assurance that all elements of the plan will in fact be implemented or implemented on schedule. Some combination of short and long range review is required.

Similarly, the Metropolitan Transportation Commission (MTC) staff in San Francisco has focused predominantly on short range project approvals and fund allocations. However, MTC staff is frustrated by their lack of ability to affect the types of improvements that are being prepared to be submitted for project approval. Again, some combination of a short range and long range focus is required.

A significant barrier to developing a more integrated long and short range planning approach is the fact that both the process and methodologies in wide spread use in state and regional planning efforts enforce a sequential review of long range system planning and programming. Different options, impacts, and issues are addressed in planning and programming. The master plan philosophy remains prevalent and explicit consideration of uncertainty and system plan revision is ignored.

Also, no one methodology or consistent set of technical models is likely to be sufficient for the analyses required in a more integrated approach for planning and programming. This conclusion is based on two considerations. First, no methodology which addresses all of the relevant technical issues in a broad analysis framework (e.g. more comprehensive than current economic analysis approaches) is likely to prove feasible for complex regional and statewide planning problems. Second, given a set of models or procedures which emphasize a specific issue, or set of issues, the techniques which are appropriate will vary. In short, analysis cannot be geared simply toward producing a plan. Rather different information (amount, type, and level of detail) will be required at different points in the process.

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APPENDIX III. DRAFT LANGUAGE FOR THE CLEAN AIR ACT

Sec. ______ For the purpose of encouraging and facilitating the development and implementation of areawide air quality management plans--

AGENCY DESIGNATION

A.1) The Governor of each State shall, within [ ], and after consultation with the appropriate elected and other officials of local governments, designate for each air quality control region or portion thereof a single organization capable of developing effective air quality management plans for such area.

A.2) In the case of an air quality control region which is located in two or more States, the Governors of the respective States, after consultation with each other and with the appropriate elected and other officials of local governments of their respective States, shall cooperate in designating, within [ ], a single organization capable of developing effective air quality management plans for such area.

A.3) If a Governor, or in the case of an interstate region, the Governors, do not designate a planning organization within the times required by paragraphs 1) or 2) (whichever is applicable), the chief elected officials of local governments within an air quality control region or portion thereof may by agreement designate a single organization capable of developing effective air quality management plans for such area.

A.4) The Organization designated under paragraph A.1), A.2), or

A.3) shall be a) an existing regional agency, except when the designating official or officials determine and demonstrate to the Administrator that no such agency capable of air quality planning exists; b) an agency composed of elected officials or their designees from each local government represented by such agency; and c) an agency capable of entering into binding agreements with other agencies for planning and for implementation of approved programs.

A.5) Designations under this paragraph shall be approved by the Administrator unless he determines that such designated agency does not meet the requirements established under subparagraphs A.1 to A.4 of this paragraph.

A.6) For all portions of a State which within [ ] are not designated under paragraph A.1), A.2), or A.3), the State shall act as an air quality management planning organization.

PROCESS GUIDELINES

B. Not later than [ ], the Administrator, after consultation with appropriate Federal, State, and local officials, shall submit to Congress, and not later than 90 days after such submission, promulgate guidelines for the development by each air quality management agency of a document describing its planning process. Such guidelines shall require, at a minimum, that such document describe procedures and assignments of responsibility for

1) the identification and consideration of alternative courses of

action;

2) identification of social, economic, and environmental effects of the alternatives;

3) involvement of, and information exchange with, other agencies, the general public, and affected interest groups throughout the planning process;

4) coordination of air quality management planning with other ongoing planning processes, and resolution of conflicts among programs;

5) monitoring the effects of air quality management plans as they are implemented;

6) revising air quality management plans to reflect changes in conditions to previous plans based on new information, monitoring, or other changing conditions and circumstances.

The Administrator shall not approve any plan 1) for which implementation did not occur as specified for the preceding period, unless the submitting agency demonstrates that the failure to implement was due to reasons or causes not forseeable at the time of submissions, and 2) which does not meet the criteria specified in the preceding paragraph.

Federal funds shall not be approved for a project that is not consistent with an approved air quality management plan. An approved plan shall be required before any finding of consistency may be made.

LIST OF ABBREVIATIONS

A.Q.C.R.	Air Quality Control Region
A.Q.M.A.	Air Quality Management Area
A.Q.M.P.	Air Quality Management Plan
B.R.A.	Boston Redevelopment Authority
C.B.D.	Central Business District
C.F.R.	Code of Federal Regulations
D.O.T.	U. S. Department of Transportation
E.P.A.	U. S. Environmental Protection Agency
F.H.W.A.	Federal Highway Administration
F.R.	Federal Register
M.D.C.	Metropolitan (Boston) District Commission
M.D.P.W.	Massachusetts Department of Public Works
M.I.T.	Massachusetts Institute of Technology
M.P.O.	Metropolitan Planning Organization
N.C.H.R.P.	National Cooperative Highway Research Program
S.I.P.	State Implementation Plan
T.C.P.	Transportation Control Plan
T.I.P.	Transportation Improvement Program
T.S.M.	Transportation Systems Management
T.S.M.E.	Transportation Systems Management Element
U.M.T.A.	Urban Mass Transportation Administration
U.S.C.	United States Code
V.M.T.	Vehicle Miles Travelled